THE

CHRISTIAN PHILOSOPHY

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AMERICAN INSTITUTE OF CHRISTIAN PHILOSOPHY

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ON THE ORIGIN AND PRIMITIVE STATE OF MAN.

[A Lecture delivered before the Summer School of Christian Philosophy, 15th July, 1881.]

By Prof. Stephen Alexander, LL.D., of Princeton.

WERE a ship's company about to land on what seemed to be a desolate island, traces, if any, of the presence of wild beasts might occasion some alarm; but as, moreover, the island might be inhabited by men, in view of that contingency the company, on landing, would be apt to take with them their weapons of defence, if not also of offence: it being a matter of universal experience that man is injurious, often even cruel, to his fellow-man. He kills for the mere sake of killing; he gives pain, and finds satisfaction, such as it is, in so doing. Remorselessly he does this when he thinks he can gain thereby; or he destroys the property of his neighbor, and this sometimes with dire hatred: exemplifying thus *malice in action.* He even lays plans and pursues them with the special design and purpose of effecting the pains and injuries already specified and others of a like character, and even for the production of ill-will: and this is *malice prepense.* Then, too, a careful attention to his own thoughts and feelings reveals a contest between judgment and inclination, such as led a great Roman poet to exclaim:

> "I see and approve the better;
> The worse I pursue."[1]

This inward contest gives a practical meaning to the term self-denial. It indicates the wrong "bent"—*depravity.* That all this is true everywhere and at all times, and that it has been so

[1] ". . . Video meliora, proboque;
Deteriora sequor."—Ovid, *Metam.* vii., line 20.

within the limits of authentic history, may be regarded as a *generalization* accepted by the thinking portion of the race; and, going farther than that, in the very manner of a *scientific induction*, that it may be regarded as characteristic of the race that *man is wicked.*

And though "the exceeding sinfulness of sin" may not always be admitted, nor even its veritable character discerned, yet (*Scripture apart*) the induction still remains that *man is injuriously, and thus hatefully, wicked.*

Turn we next to one of the most exhaustively perfect inductions of science. The careful investigations of physiologists with respect to the processes of digestion, assimilation, circulation, respiration, nutrition, secretion, and excretion go to show that by means of them the whole body, or nearly the whole, is renewed as often as once in seven years. And although, in vigorous health, in early life an excess of vitality is found, and later in life the energetic action of vitality appears in the development of new functions, yet as life advances—even in cases in which no violent disease supervenes—still the process of gradual building up is overbalanced by that of destruction; the vital actions are themselves weakened, and old age, and finally death, must ensue; and the induction of biology hence is that with regard to all that now lives on the earth, *wicked man included*, death is the inevitable *sequence of life:* even vegetable life being, for like reasons, included. Yet that would seem to be a gloomy and restricted view which would regard life as being but a continuous death. Life, rather than that, presents a continued contest against the approach of death.

Now Scripture accounts in its own way for the two dire characteristics of man's wickedness and his mortality, showing how the one is, and has for ages been, dependent on the other. It antedates both; exhibiting the character of man at his creation as being the very opposite to that of wicked, and he consequently innocent; and, withal, that he was not subject to death before he transgressed that prohibition which was the trial of his obedience, but immediately became thus subject when he in that way transgressed.

Thus "sin entered the world, and death by sin," and "so death passed upon all men for that all have sinned"—though not under the same circumstances; the *human race* becoming thus mortal, and so far like the brutes.

Now no trace of either the primitive man of Scripture or of his habitation is, in the nature of things, to be had for a criterion by which, in the way of scientific induction, the Scripture hypothesis might be tried. Scientific induction can deal alone with man confessedly wicked and mortal.

Any agreement, then, between the result of mere scientific induction as to the origin and the primitive state of man and the Scripture hypothesis with respect to the same must be regarded as among the things impracticable while the world lasts. A discrepancy thus inevitable may *itself* even be admitted to exist, aside from the question of the truth or of the falsehood of either hypothesis.

But all this does not make the Scripture hypothesis inconsistent with the existing state of things; and so impossible and also unreasonable. And yet the discrepancy between mere scientific induction—working as faithfully as it may, with all it can learn of wicked and mortal man, and some of his antecedents—and the Scripture hypothesis which antedates both man's wickedness and his mortality, accounting for them both in its own way, *this* discrepancy is itself *inevitable*, and *must continue so to be.* In view of all that, we respectfully submit that *the anxiety of good men with regard to a discrepancy, under just such circumstances, should be permanently laid aside.*

Just here we venture to remark that neither the abuse of a doctrine nor yet the undue extension of its application can make the doctrine itself untrue within its appropriate limits. And so that which is indeed science will be science still, though it may be enlisted in the service of atheism; and the undue extension of the theory of evolution so as to include the human race does not forbid the investigation of the question whether it may not in a measure apply to the early races of inferior animals, among whom changes by evolution are supposed to have been superinduced, and which have become permanent by natural descent: with regard to all which the verdict of some even

well informed appears to be, "not" yet "proven," while others, within the limits we have here indicated, fully accept it, and some unduly extend those limits to include the human race; though the careful study of the fossil remains of man furnishes evidence that man appears as such at the outset, not *ascending* from a lower animal. And what a marvel it would be, should what seemed to be evidence of such an ascent ever be discovered! For, in all that veritably distinguishes him as man, so great is the elevation of the human being above even the most sagacious brute that the steps of the *ascent* from the brute to the man must be indeed innumerable; insomuch that there *would not be time* for their succession, even during the long period of the existence and progress of life on the earth.

But beyond all that, what distinguishes the human being as such, the capacity for indefinite progress, power of generalization, of induction, of science, taste shown in the direction of true art, philosophy, the conception of the infinite, and the religious element, or at least the capacity for it, however the knowledge of it may have been obtained—these exist not even imperfectly in the brute, nor could they have existed antecedently to the advent of man, but only beutiful semblances of such peculiarities —"the shadows of good things to come, and not the very images of those things."[1] How then could development proceed out of that which was itself not even imperfectly present to be developed?

Man, alas! often becomes beastly, and that to an increasing extent from generation to generation, until his very physical constitution is to some extent degraded. Yet under suitable cultivation he may be made to ascend from that through successive generations; for his is *human nature* still. But the most sagacious brute could not thus *ascend*, and so the beast become *manly;* for there would be naught that is verily distinctive of the human being to be found in him to *be* developed. (And yet, within the lower limits already insisted on, the development hypothesis is deserving of all the study which has been spent upon it and more.)

[1] The apostle Paul's truly beautiful figure, employed in a very different connection. (See Hebrews x. 1.)

Among the existing animals to which the application of the development theory would have to be at the least very special would seem to be the Ornithorhyncus, or duck-bill, and the Echidna, or Australian hedgehog.

The Ornithorhyncus has a bill like a duck, its forefeet webbed like a mole, and its body, like that of a mole, is covered with fur. It searches for food in shallow water, using its bill like a duck. Its female lays her eggs in a nest not very unlike to that of a domestic fowl, and it seems to be ascertained that she suckles her young.

The Echidna is furnished with a sharp bill, in place of a mouth. It, like the other animal here described, belongs to the class of quadrupeds designated as *insectivoræ*, or insect-eaters. It has quills like those of a porcupine, and beneath them, at certain seasons, a rich fur. How were the ancestors of these animals "developed"?[1]

That there has been a special succession in the arrangement of life on the earth—though atheism might hesitate to call it a plan—is a truth the enunciation of which has become trite. But if, withal, in accordance with the development theory, the various and successive manifestations of this in the earlier animals, among those which preceded man especially, are the *outcome*, every one of that immediately preceding, this itself would be so far characteristic of that *foresight* and *provision for the future* which pertains to *intelligence* as to furnish an argument against atheism of great interest.

Another undue extension of the development hypothesis is that to the other extreme, in the supposed development of life from the lifeless. But few can now be found to favor this. For life is "not a property of matter."[2] It in a special manner controls mere properties; for wherever life in any perfection exists it is individualizing and dominant; every part working for the benefit of every other part, as well as for the one whole, the parts of the system, as Kant phrases it, being "alternately means and ends." And life, through the agency of *organized* material, somehow

[1] Enlarged drawings of the two animals in question were exhibited during the lecture.

[2] Prof. Tyndall's phrase.

harnesses and subdues the merely physical properties, and makes them work in the service of *functions*. The individual being is not alive because *it has functions*, but it possesses functions *because* it is alive, and only *while* it is alive.

No wonder, then, that the succession of bodily life is found only in the line of life. The most simple organic constituent in that line is what is termed *protoplasm*, which Prof. Tyndall designates as "the physical basis of life;" and the recent admirably devised and carefully conducted experiments of that distinguished scientist have shown conclusively, if anything can, that life cannot originate by "spontaneous generation." Life cannot, then, be developed from the lifeless, which is itself possessed of no *functional arrangement*.

And yet our own bodily life is almost entirely nourished, not by that which *is* alive, but that which *has been* alive.

For our food, as is well known and acknowledged, consists of organized material, with scarce other exceptions than those of salt and water—and sometimes of salts such as water will dissolve. And yet that organized material must be deprived of the life which belonged to it before that material can be useful as food. Even the small fruits and *all* grains need to be crushed, and so suffer a partial dissolution, to prepare them for food, which effectually unfits nearly the whole of them for the further development of life. If aught then remain in the state of unbroken seed, that is *therefore* not suited for nourishment as food.

And the like is true when the seed is sown to bring about vegetable life and growth, insomuch that before that can happen a partial dissolution of the seed takes place; and thus "except a corn of wheat fall into the ground, and die, it abideth alone; but if it die, it bringeth forth much fruit."[1]

Our organisms thus are reinvigorated and built up through the various processes and functions of our live bodies, by the use as food of that which *has been* alive, but which has not been *too long* dead; so that it is capable of being placed anew in what we may term the *functional* line. This recent *death* of what we use for food is further assured by the very process of cookery, but which destroys not the capability of the organized material

[1] The Saviour's own illustration. (See John xii. 24.)

entering anew into the functional arrangement, unless the organic structure be destroyed by the process and its results, being "overdone;" and the various processes for "preserving" food are first steps in cooking.

From the whole it appears that, in an important sense, in our own personal experience do we find *the dead to be made alive*.[1] But it should here be further remarked that material artificially combined, and as regards its chemical constitution and properties exhibiting a result entirely satisfactory, so as in those respects to completely resemble appropriate food afforded by means of the organic and functional arrangements of a living animal; being similar so far to that of the already dead organized material heretofore described, but *lacking the prerequisite of being previously brought into the functional line*, while in a body still alive, though it may be all right chemically, will yet be found to be unwholesome as food.[2] And so it has been asserted that milk, faultless as regards its chemical constitution, but *artificially prepared*, when made use of for food in a Parisian hospital, proved little better than a slow poison to the unfortunate infants which were fed with it.

Both the conditions, then, so singularly combined in the organic material of our wholesome food seem to be essential; viz., that having been alive, its death should be insured, and that it should when properly used as nourishment be capable of being brought into the functional line of a new life.

Next as to the nature of *zero*. *Zero* in any special investigation is not absolutely nothing, but it is the *absence of the quantity in question*.

Thus the *zero* of light is darkness; the *zero* of matter is a space void of matter; the *zero* of motion is absolute rest; the *zero* of sound is silence; and, in the case already otherwise discussed, bodily life is reduced to *zero* when the body is killed; etc. etc.

[1] It is the answer in nature to the question, "Why should it be thought a thing incredible with you, that God should raise the dead?" (Acts xxvi. 8)—and that to a resurrection far more glorious.

[2] And artificially prepared flavorings, made to resemble veritable extracts, must be, to some extent, unwholesome.

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And although, in experience, the nothing precedes the something at that something's origin, yet our knowledge of the something must precede that of the nothing—the *zero* of the something's absence.

Not discerning what the assertion of a *zero* implied was the difficulty of the sophistical Hindu, who reasoned thus: "You tell me that God said, 'Let there be light, and there was light.' Then before light was darkness. Therefore God is darkness;"[1] thus confounding two questions, viz.: 1st. *How* was it (what was the condition of things) before it was light? Of course it was *dark*. 2d. *What was* there before the light? *Ans. The energy* from which the light *sprang*. The like difficulty would seem to have pervaded a philosophy now no longer in vogue, which represented the Great First Cause as being the Great Nought. Now whatever may be intended to be conveyed by the expression, the Great Pre-existent cannot be an *absolute zero*.

For such a *zero* has in itself no *energy* to bring about results such as we discern everywhere.

But the pre-existent must have had *in itself* the energy which has become thus efficient and progressive in its results, which withal are brought about in accordance with inexorable law. Can an energy thus self-existent and progressive throughout all nature be any less than *almighty?* Is it to be attributed to GOD—*Almighty?* Let us see. We quote:

"Independent of the pleasures of fancy and imagination, and social converse, man is constituted a speculative being; he contemplates the world and the objects around him, not with a passive, indifferent gaze, as a set of phenomena in which he has no further interest than as they affect his immediate situation and can be rendered subservient to his comfort, but as a system disposed with order and design. He approves and feels the highest admiration of the harmony of its parts, the skill and efficiency of its contrivances. Some of these, which he can best trace and understand, he attempts to imitate, and finds that to a certain extent, though rudely and imperfectly, he can succeed,—in others that, although he can comprehend the nature of the contrivance, he is totally destitute of all means of imitation;—while in others again, and those evidently the most important, though he sees the effect produced, yet the means by which it

[1] As reported by one of the Rev. Drs. Scudder, missionaries in that quarter of the world.

is done are alike beyond his knowledge and his control. Thus he is led to the conception of a Power and an Intelligence superior to his own, and adequate to the production and maintenance of all that he sees in nature —a Power and an Intelligence to which he may well apply the term infinite, since he not only sees no actual limit to the instances in which they are manifested, but finds, on the contrary, that the farther he inquires, and the wider the sphere of his observation extends, they continually open upon him in increasing abundance; and that the study of one prepares him to understand and appreciate another, refinement follows on refinement, wonder on wonder, till his faculties become bewildered in admiration, and his intellect falls back on itself in utter hopelessness of arriving at an end."[1]

(The bare outline of this noble *induction*, for such it is, would seem to be: Nature in its various operations exhibits itself as being seemingly so infinitely more wise and powerful than man that we must admit a veritable Power and Intelligence at work in all the operations traceable in nature everywhere.)

This quotation does not make especially conspicuous that anticipation of and provision for the requirements of the future, such as would be especially characteristic of *intelligence*, *skill*, and *power*, supplemented and exalted as all that even is by a manifold *adaptation* of properties and conditions.

The good old-fashioned doctrine of adaptation, by some decried, receives additional confirmation as knowledge becomes more extended and accurate. Witness the following example:

Light does not need the eye, but the eye, to be of use for seeing, needs light; and by anticipation of their use, the infant is furnished with eyes complete as soon as it can use them. And though light is poured upon what is in its own way among the most sensitive of the organs of the human body with a velocity which would accomplish some 261 days' journey by steam, at the rate of 30 miles an hour, all in a single second of time; so delicate are the luminous vibrations, and so well *suited* to the eye, that instead of being blinded by the influx, we rejoice in it.

But would the optic nerve be equally sensitive, or sensitive at all, to the calorific rays? The awfully daring experiment to

[1] Sir John F. W. Herschel,—"Preliminary Discourse on the Study of Natural Philosophy," pp. 3 and 4 of the American edition.

"For the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead" (Romans i. 20).

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try this has shown the visual apparatus of the eye to be insensible to the rays of heat. We quote the description of the trial:

"The layer of iodine used in the foregoing experiments, when placed before the eye, intercepted the light of the noonday sun. No trace of light from the electric lamp was visible, even in the darkest room, when a white screen was placed at the focus of the mirror. It was thought, however, that if the retina itself were brought into the focus the sensation of light might be experienced. The danger of this experiment was twofold. If the dark rays were absorbed in a high degree by the humors of the eye, the albumen of the humors might coagulate along the line of the rays. If, on the contrary, no such high absorption took place, the rays might reach the retina with a force sufficient to destroy it. To test the likelihood of these results, experiments were made on water and on a solution of alum, and they showed it to be very improbable that in the brief time requisite for an experiment any serious damage could be done. The eye was, therefore, caused to approach the dark focus, no defence in the first instance being provided; but the heat acting upon the parts surrounding the pupil could not be borne. An aperture was therefore pierced in a plate of metal, and the eye, placed behind the aperture, was caused to approach the point of convergence of invisible rays. The focus was attained, first by the pupil, and afterwards by the retina. Removing the eye, but permitting the plate of metal to remain, a sheet of platinum foil was placed in the position occupied by the retina a moment before. The platinum became red hot. No sensible damage was done to the eye by this experiment; no impression of light was produced; the optic nerve was not even conscious of heat.

"But the humors of the eye are known to be highly impervious to the invisible calorific rays, and the question therefore arises, 'Did the radiation in the foregoing experiment reach the retina at all?' The answer is that the rays were in part transmitted to the retina, and in part absorbed by the humors. Experiments on the eye of an ox showed that the proportion of obscure rays which reached the retina amounted to eighteen per cent of the total radiation; while the luminous emission from the electric light amounts to no more than ten per cent of the same total. Were the purely luminous rays of the electric lamp converged by our mirror to a focus, there can be no doubt as to the fate of the retina placed there. Its ruin would be inevitable; and yet this would be accomplished by an amount of wave motion but little more than half of that which the retina bears without being conscious of it, at the focus of the invisible rays."[1]

It appears thus that while the retina accepts of and is sensitive to the vibrations of light, it is utterly insensible to the heat

[1] Prof. John Tyndall, F.R.S.,—"The 'Bede' Lecture," pp. 25 and 26 of the American edition.

vibrations; which, notwithstanding, when applied to the platinum not only heated it but also brought it up to the state of being luminous.

If all this does not exhibit a *special adaptation*, let a new and larger term be devised.

This, moreover, supplements and adds additional force to Sir John Herschel's admirable induction, before quoted.

But it is alleged that the God it contemplates must be *unconditioned*, and that an existence *without conditions* is not to be thought of, and so is not supposable. Though we may admit *that*, we should with it make special account of what seems to have been forgotten by those who stumble at the objection to the existence of the unconditioned, that there is another state of not being subject to conditions, and that is being gloriously *above* them, and this is found in the "Living God and Everlasting King" to whom the induction leads; and it is no objection to his existence and attributes that he must be *incomprehensible*, but the contrary.

In the light of this, and what was before alleged with regard to the elevation even yet of the human being, it should be seen that the Scripture hypothesis as to man's origin is pre-eminently worthy of the exalted being which, consistently with all that, it represents man to have been, when it narrates how God, in sublime self-council, said, "Let us make man in our image, after our likeness," and "so he created man in his own image, in the image of God created he him;" and he gave man dominion over all this lower creation, and man thus formed in God's image stood erect and veritably *godlike*.

And as respects this sublime epic, whether it were regarded as truth or fiction, in either case the world was richer when that was enunciated.

The Scripture narrative withal gives its own consistent account of the origin and progress of human sin.

And then it stands alone in reconciling the apparent contradictions seen in the progress of terrestrial arrangements—some of which are manifestly benevolent, while others seem to be the reverse—when it indicates that man is now placed under a *remedial system* continually in progress.

And then to account for all the evidences of almighty energy,

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infinite skill, and surprising adaptation, combined with prescience and provision for the future, nothing else is great enough; nothing else is wise enough; nothing else is powerful enough; nothing else is enduring enough; nothing else is good enough, but the "Living God and Everlasting King" of a very old-fashioned book.

This is the great and final hypothesis, an hypothesis broad as the universe which God sustains and pervades by his power, and lasting as the eternity which he, "the always ancient one,"[1] "inhabiteth;" an hypothesis withal in the view of which the justly admitted principle of the uniformity of causation admits of this sublime paraphrase: SCIENCE IS PRACTICABLE, AND SO SCIENCE EXISTS, BECAUSE GOD IS TRUE.

[1] For the special terms employed in this phraseology, see Pollok's "Course of Time," Book I., paragraph 8; and Isaiah lvii. 15.

ASTRONOMICAL FACTS AND FANCIES FOR PHILOSOPHICAL THINKERS.

[A Lecture delivered before the Summer School of Christian Philosophy, 16th July, 1881.]

By C. A. Young, LL.D.
Professor of Astronomy, Princeton, N. J.

THE very immensity of the astronomer's domain, the almost unimaginable scale of space and time, of mass and force and motion, is itself a quasi-philosophical fact, of equal importance with the inverted immensity, if I may use the expression, the inconceivable minuteness, of the times and spaces dealt with by the microscopist and the student of molecular physics: and the importance lies in making us to feel, as well as know, that in our thinking we must divest ourselves of the idea that anything is absolutely great or absolutely small. Nothing, as De Morgan has said, is great, nothing small, by itself considered. *Greater* and *smaller* are really the absolute expressions. If I speak of anything as great or small, I only mean greater or smaller than some standard to which either explicitly or implicitly I refer it. I can call the sun itself huge, and the molecule of hydrogen minute, only relatively. The ages through which the solar system has endured are long; the vibrations of light itself are rapid only by comparison. Lightning is swift, and the crawl of the glacier slow, only as referred to daily life and its processes.

For I take it that the dimensions of our usual surroundings, the size of our own bodies, the swiftness of our own movements, furnish us the standards to which we instinctively refer everything else until we have learned to free ourselves from such narrow limitations. Familiarity with astronomical dimen-

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sions is perhaps the most efficient liberator possible, for the astronomer has to deal simultaneously with waves of light, and with the stupendous spaces which are the solitudes between the stars.

Consider simply the distance of the sun,—about 93 millions of miles. Try to grasp the idea. Think of a weary, foot-sore pedestrian, swift as the English Rowell if you please, making his hundred miles a day for 930,000 days—days numbered not by years, by decades, by generations, or by centuries even, but by millenniums. Two thousand five hundred years at the rate of 100 miles a day would not cover the journey, but would still leave four centuries and more to be spent upon the road.

And yet this distance of the sun, this radius of the great orbit of the earth, is only one of the lesser intervals of heaven. Light makes almost nothing of it, and accomplishes it in 500 seconds,—only eight minutes and a third. Let us speak of greater things. In our own system Neptune describes an orbit 30 times as large as the earth's, and then, beyond, comes a vacancy between our domain and that of our next neighbors: far across the darkness we see their lights, and yet so remote are they that our sun itself, huge as it is, would shrink to an indivisible point $\frac{1}{100}''$ in diameter—nay, even the wide circle of the earth's movement around the sun makes no evident displacement of their positions. It is only since the present century came in that we have been able in a few isolated cases to detect the almost infinitesimal yearly oscillation which thus becomes the measure of their remoteness. It is a principle easily demonstrated that to an observer in motion all things appear precisely as if he were at rest himself, and everything else had his own motion transferred to it, reversed. From this it follows that to us on the earth every star in all the sky must appear to be describing a great orbit 186 millions of miles in diameter, the precise counterpart of the earth's own orbit; and yet it is only a few of our very nearest neighbors which can be seen to move at all; and in their case the motion is detected only by the most refined and delicate of observations. Our nearest neighbor, α Centauri, swings less than $2''$ back and forth in this annual vibration, and $2''$ is equivalent to about 2 ft. at a distance of 40 miles. Figure to

yourself the sun as having a diameter of two feet; on this scale the earth would be about as large as a pea at a distance of 220 feet, and the nearest star would be in Australia, on the opposite side of the earth. Light itself takes time for such a journey—three years and a half. And this star of the Centauri is much the nearest so far known. Some 15 or 20 others have had their distances measured after a fashion, the remotest of which (the pole-star among them) are about ten times as far away: with our present means of measurement this is about the limit of our possible determinations, but not of our speculations. We can guess and estimate with the highest probability that stars may be visible to us whose light has been upon the road not 3 or 30 years, but hundreds or even thousands of years.

It is an interesting question whether our space is bounded—whether we and our earth and our stars are but a portion of a limitless region, peopled throughout with stars, as our immediate neighborhood is, and into which our vision penetrates indefinitely—or whether we live in a colony by some means cut off and separate from other space and systems. In respect to this I can only put before you probabilities and not surely settled facts. One thing, however, is demonstrable. *If* space were infinite and uniformly starred, and *if* light passed unobstructed through this space, then the whole nightly sky would blaze like the noonday sun: wherever one might look the heavens would be full of uniform dazzling light. Since this is not the case, it is quite sure that one of three hypotheses must be admitted. Either our stellar universe is not infinite, but we live in a cut-off portion of space; or else space is not anything like uniformly starred; or else, finally, light fades out in travelling. I say one of the three hypotheses must be admitted, but I do not mean that either excludes the others. As to my own opinion, if you care for it, it seems to me quite certain that the last supposition of the three must certainly be true. Light is, and must be, obstructed to some extent in passing from one star to another, because we have every reason to believe that between the stars there are considerable quantities of matter, bodies which, when encountered by our system, are recognized as comets and meteors.

We know but little, to be sure, as to the amount and distri-

bution of this matter, because the particles never become visible to us except when they strike our atmosphere and are seen as shooting stars. But their number is very much larger than we are apt to think—the estimate of Professor Newton of Yale, which I believe to be substantially correct, sets the total at about $7\frac{1}{2}$ millions daily. This would put the particles at distances from each other of about 250 miles, on the average. Of course no one can say with certainty that in interstellar space these particles are as numerous as near the sun. I think so, however, for the following reasons. On the one hand, the attraction of the sun undoubtedly draws them in from all sides, and thus tends to condense them into its immediate neighborhood, as has been insisted on by Peirce, Proctor, and others; but then, on the other hand,—a fact which these gentlemen seem to have overlooked,—the bodies thus drawn in move *faster and faster* when nearing the sun, and this tends to separate them: just as a procession of carriages moving along an uneven road are crowded together in all the difficult and uphill parts where they move slowly, and are spread apart where they go more rapidly. Thus there is a more or less complete compensation between the two actions, and the sun's attraction has very little if any effect upon the *number* of particles to the unit of space, but only accelerates their speed. These particles are undoubtedly very minute. The estimates of Newcomb and Harkness go to show that the majority of them are probably smaller than a pin's head. Now, a haze consisting merely of a pin's head once in 250 miles is not very obstructive to light; but it cuts off something, and when we take into account the immensity of space, I for one am ready to admit that the effect becomes sensible in the brightness of the more distant stars. The idea is borne out by a well-ascertained fact, which is this: The number of the 12th magnitude stars, while it is greater than that of the 11th, is not so much greater as we should expect according to the hypothesis of a reasonably uniform distribution of stars in space and a perfectly free transmission of light. Knowing that the average 12th magnitude star gives about $2\frac{4}{10}$ less light than the average 11th magnitude star (the 11th bearing the same ratio to the brightness of the 10th, and so on), we can compute how their numbers ought to compare. When we do this we find a

decided deficiency in the actual as compared with the computed numbers of the fainter stars, just such as would follow from a real haziness of space.

Of course if this is so our visual knowledge of the stellar universe is limited, as to one looking out upon a landscape through a fog. Of the great "beyond" we can neither affirm nor deny. While we know no reasons for believing its constitution different from that of the cosmos around us, yet, on the other hand, he would be very rash who should undertake to assert that there is no difference, and that the same regimen extends through all the material universe.

Mr. Proctor in a paper entitled, I believe, "Our Place among the Infinities" makes some very thoughtful and suggestive remarks upon the reasonable and unreasonable extensions of inductive reasoning, in such matters, and upon the difficulty which many feel in withholding both belief and denial where there is no means of knowing. One feels—at least I own I do—something half like resentment at being locked out from the knowledge of anything; as, for instance, at the impossibility of ever seeing the farther side of the moon; but there is no use in the feeling: we must accept our limitations, and make the best of them. Perhaps they will disappear in the future life.

Before leaving this subject of the distribution of worlds in space, I add a single word as to the two other suppositions which may explain the darkness of the midnight sky. Recall what was said that *if* space were uniformly starred and infinite, and if light freely transmitted, the sky would blaze all over. We have seen that light is not in fact freely transmitted. But it may also be that, on the large scale even, stars are not uniformly distributed in space,—that they are collected into clusters, and these clusters again into clusters of clusters, and so on; the interval between adjacent clusters being as great in comparison with the dimensions of clusters themselves, as the intervals between the constituent stars are great compared with the sizes of the stars. On this hypothesis—and it admits of considerable modifications without materially changing the result—the sky would be as we see it.

And now as to the third hypothesis. Every one knows of course that at present all the phenomena of light and radiant

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heat and electricity are usually explained by means of an hypothetical medium known as the ether: the latest physical philosophy indeed goes so far as to try to account for matter itself by supposing that its atoms are only vortices, like smoke-rings, in this ether. We have not time to discuss the astonishing characteristics which we must ascribe to this substance in order to make it answer the conditions: it is enough to say that no physicist sees any way to get along without it, and that by means of it many most curious facts are perfectly accounted for, and some which would never otherwise have been dreamed of have been predicted and described in theory, before ever they were seen by human eyes. Now if we can suppose that as the atmospheres which cover the earth and planets thin out and come to a limit at a certain height, so this ether which envelops the sun and earth and the stars we see is also bounded and has a limit, then we are thus islanded in space. No influence, or token even, of material existence could reach us from anything outside, just as no sound of earth can be propagated or heard above the air. I do not feel sure enough, however, about the existence of the ether to lay great stress on this idea, especially as the presence of meteoric matter in interstellar space, which is certain, explains the astronomical facts so far as needed.

Perhaps this is as good a place as any for a few words upon another but related subject upon which a great deal of misapprehension seems to exist. I hear continued references, in the pulpit and elsewhere also, to Maedler's theory of "a central sun;" as if it were a well-established fact of science that our sun and the other bright stars of our sky (which are presumed to be relatively not very remote and to constitute with our sun a single stellar "system")—that sun and stars, I say, are all revolving together in orbits around some great central mass, which Maedler identified with Alcyone, the principal star of the Pleiades. When Maedler first published this speculation, some forty years ago, its foundations were very slender for such a superstructure—and the lapse of time has weakened, yes, pretty nearly destroyed, them. He based his idea upon two facts which are undoubtedly correct. One was the discovery of the elder Herschel, since abundantly confirmed, that the sun with

its attendant planets is rushing through space, and at present moving towards a point in the sky known as "the apex of the sun's way," and situated in the constellation of Hercules. The other fact is that the Pleiades are in a part of the sky about 90° from the point to which the sun's motion is directed, and all the stars of this little group have about the same amount of so-called "proper motion" or drift, directed apparently from this apex. Of course every one sees that this is just what would happen if the sun were really moving in a great circular orbit around the Pleiades. Stars near the centre of the system would be actually at rest, but would have an apparent drift just contrary to the observer's own motion.

But the idea that the stars are really moving in closed orbits around a centre has no support worth mentioning. In the case of the solar system we have a central body of more than 700 times the united mass of all its planets—enough to dominate and control the whole; the perturbations resulting from their mutual action being entirely insignificant, and producing no important modification in the nature of the movements. In the stellar system, on the contrary, there is no reason to think of any single star as at all comparable to the united mass of the rest—there is no central dominance and no imperial power, but we have to do with a republic of bodies comparatively equal. They all move, but the motion of each is mainly controlled by the attractions of its nearest neighbors; it is all perturbation, and no orbit. The stars behave probably much as bees do in a swarm. Two which happen to come near are, for the time, controlled mainly by their mutual influence; but when they have separated, they move on in lines nearly straight until other stars are met. The mathematical theory of such motions is vastly more complicated and difficult than that of the planetary or cometary orbits, and has not yet been worked out. But *orbital* motion, as commonly understood, i.e. movement in self-returning curves, is quite out of the question, except upon the untenable supposition that the stars (including the sun) form a nearly globular cluster widely separated from other masses in space. In this case it is true the attraction of the whole mass would act at its centre of gravity, and the movement of stars not too near others might be mainly governed by this general attraction.

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I mentioned that the chief reason which induced Maedler to select Alcyone as his central sun was the fact that all the stars in the Pleiades had a proper motion directed backward from the apex of the sun's way. But it is now found that several other groups of stars fulfil the same condition of a common backward motion, though none of these groups are so conspicuous as the Pleiades.

Another kindred theory of the past to which it may be well to devote a few sentences is that the so-called nebulæ and clusters are really composed of stars as large as the isolated ones—our sun, for instance—and owe their peculiar appearance merely to their distance,—far, far beyond the region of the stars which constitute the group to which our sun belongs. There was something very striking to the fancy in the idea that such a faint, hardly visible cloud is a mass of full-grown, blazing suns, whose remoteness alone has reduced them to the appearance of an irresolvable haze. But poetical or not, it is almost certainly untrue.

Many of the nebulæ, as you know, are shown by the spectroscope to be masses of glowing gas in which *hydrogen* is more or less perceptible, though the most conspicuous line of the nebula spectrum is due to some unknown substance. I wish to be explicit here, because some dozen years ago, when Mr. Huggins first established the gaseous nature of these bodies by means of their spectrum, he found that the principal bright line seemed to coincide with a line of *nitrogen*. The statement then began to be made that *nitrogen* was a main constituent of the nebulæ; and though Mr. Huggins very soon after found out that the line could not be due to this element (without, however, finding what it *is* caused by), and though, metaphorically speaking, he and his brother-astronomers started out together at once with bludgeons after the Falsehood, yet so swift-footed and tough is this daughter of the evil one that not even yet has she been silenced, but every day or two I read or hear some assertion that the nebulæ are chiefly composed of nitrogen. It is very curious —I own it seems to me very strange—that the nebulæ, the comets, the solar corona, and the streamers of the Aurora Borealis show no community of *substance;* each by its spectrum seems to indicate the existence in it of some unknown gas of inconceivable tensity,—a different gas for each of the four.

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So far as we can judge from the relations between the nebulæ and the stars which appear to be entangled in their misty depths, the stars and nebulæ are at the same distance from the earth.

As to the clusters of stars, we find also such relations, in some cases between a large central star and an outlying glimmer of star-dust, as satisfies every observer that in this case also the large star and its company of infinitesimal sparks are at one and the same distance from us: and as to the large star in such a case, there is no reason to think it either nearer or more remote than other stars of similar brightness.

I have grave doubts whether this topic of which I have just been speaking—the nature of star clusters and nebulæ, and Maedler's theory of the central sun—really ought to have any place here, this morning, among facts for philosophical thinkers. One thing is certain, however, that I often hear our "Christian philosophers" in the pulpit alluding to these matters in a way which shows that it is desirable that they should be better informed as to how things really stand at present. It is, I think, absolutely certain that the stellar system, if there be such a *system*, which I am not disposed to deny or question, is not modelled at all on the planetary system, but follows a wholly different plan. It is probable that stellar gravitation indeed follows just the same laws as gravitation in the solar system, and that the laws of matter and motion remain unchanged throughout the whole material universe: the behavior of double and binary stars almost demonstrates this. But in the stellar system the relations between the masses of the bodies concerned, and their distances, are so different from the corresponding ratios in the planetary system that the cases are widely and fundamentally dissimilar, and the resulting movements can have no resemblance. Whether or not it will ever be within human power to obtain the data for an understanding of this most complicated cosmos I dare not affirm. It seems to me, however, that at present we have too little material to warrant many intelligent conclusions. We need to know the distances, not of a dozen or twenty stars, but of thousands, or at least of hundreds, with their rates and directions of motion; and this not for any one moment only, but for many centuries, before we can do much in the way of sound generalization.

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Possibly, indeed, some great mathematician may appear with a new analysis of power sufficient to deal with the general problem of a universe composed of any number of gravitating masses, starting from any initial positions with any imaginable motions, and may describe to us in advance the paths and behavior of the stars, to be verified by future generations. But if such a one is coming, "the rustle of his wings" is not audible as yet.

Probably the most interesting of all the philosophical questions which force themselves into prominence in connection with astronomy relates to the nature of what we call "attraction"—the tendency which masses of matter have to move towards each other. We say very easily that every particle of matter attracts every other particle, and we go on to state with precision that the force of the attraction varies with the quantity of matter in the particles, and inversely as the square of their distance; and these statements can be put into figures and formulæ, by means of which we can predict, a century beforehand, the place a planet will occupy on some designated day.

But what does it mean when I say that one particle *attracts* another? Has the particle intelligence to know where every other atom of the universe may be, and grappling arms to reach it with? Does it *know* the laws of its own being? and by what wit, as the younger Herschel put it, is it able to solve the differential equations of its motion (which so often puzzle human mathematicians) and determine its movements on the instant? Or am I to think of space itself as somehow the agent—the medium in which the bodies move, out of which they perhaps consist, if atoms are indeed but whirling vortices of ether? Of course all are more or less familiar with the curious theory of Le Sage, that gravitation is due to impact of infinitesimal pellets ever rushing in all directions through space—a theory which, by means of certain apparently rather violent suppositions as to the constitution of bodies, would indeed explain gravitation as the push resulting from the bombardment of the pellets, and would substitute for the mystery of attraction the equal mystery of pressure. For when we come closely to examine the matter in the light of what is known of molecular forces, pushing is just

as mysterious as pulling. So far as we can judge at present, the ultimate particles of matter never touch each other, but are always separated by spaces considerable as compared with their own dimensions. Every action of masses of matter upon each other is, in the last analysis, "action at a distance." If an atom ever *acts* at all, it always acts, in sublime disregard of the philosophic dictum, where it is not, and never where it is. For my own part, I am disposed to think that *matter* never *acts*, never pushes and never pulls, but only is acted upon by that which is not matter, but its master. In just such sense as the movements of my body are the actions of the personality which inhabit it, so it seems to me we must regard all these wonderful interactions of atoms and masses of matter as in some way the action of the all-pervading intelligence and power. I am aware that there is risk of a pantheistic turn to such speculations, a danger of identifying the Deity with the universe in and through which he manifests himself and acts; but I see no more *necessity* for a confusion in the matter than there is for confounding the soul and spirit of the human being with the material body. I cannot think of God as one who long ago made and put in motion the machinery of the universe, and now has nothing to do but watch it run, with occasional interferences to set things right; but rather as the intelligence and soul, and still the efficient mover of all things, acting according to law because he *chooses* to, and not because of some internal and superior "nature of things" to which he is obliged to be obedient like ourselves.

But whatever speculative views may be held, this at least is certain: Any two bodies—the sun and earth, for instance—move precisely as they would move if each were inhabited by a living soul of infinitely quick intelligence as to the distance and position of the other, each drawing the other by some imaginary bond, and drawing with a force accurately determined by the distance between them; just as one of you and I might do if we were on boats in the lake and connected by a rope.

Nor are these interplanetary forces insignificant. On the other hand, they are astonishingly great. I do not remember when I have been more surprised than I was a few months ago by some very simple calculations relative to this matter pub-

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lished by Mr. Warring of Poughkeepsie in the *Popular Science Monthly*.

Imagine, for the moment, that the attraction of the sun, which keeps the earth in her orbit, is replaced by bonds of steel; that wires enough, of the size of ordinary telegraph wire, are stretched between the two bodies to hold them together under the present conditions, and to prevent the earth from flying off in a tangent. Knowing the tensile strength of steel, and hence that a single wire $\frac{1}{8}$ of an inch in diameter would bear without breaking a load of about 1500 lbs. if made of the very best material, we can calculate the number of these wires which would just suffice to withstand the strain of the earth's centrifugal force. I need not go into detail as to the figures, but it appears that the wires would have to be so numerous that the whole surface of the earth, on the sunward side, would be covered with them as thick almost as blades of grass upon a lawn, so close that a mouse could not get about between them; they would have to be less than half an inch apart on the average. Unless the earth were constantly urged toward the sun by such an unimaginable power as the strain of this web of wires, she would fly off into outer space. As it is, although she rushes along with the speed of about 19 miles a *second*—(imagine it if you can—a speed more than fifty times that of the projectile from a rifled cannon)—as it is, I say, this attraction diverts her slightly from her headlong course and curves her path inward toward the sun. The curvature is very, very insignificant, being only about $\frac{1}{8}$ of an inch in 20 miles; but it is enough, and changes her otherwise straight course into an orbit, returning into itself at the end of every year.

It is hardly necessary to say that the sun's attraction is so great because the earth is so massive. If we could imagine that the earth and everything on it except some one of us were suddenly annihilated, the unfortunate survivor would still continue to circle around the sun in the same orbit and with the same tremendous speed; but no iron bands would be needed to keep him in the track: a fine silken thread would answer, for on each terrestrial mass of 100 lbs. the sun's attraction is only just about a single ounce. And lest I should be misunderstood, I will add that when the sun is overhead the power of his attraction *to lift a*

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body from the earth or *diminish its weight* is only a most minute fraction of the whole force itself, and amounts only to about $\frac{1}{30}$ of a grain on a weight of 100 lbs.

Of course the earth and moon attract each other in the same way as sun and earth. But although the moon is so much nearer than the sun, she is so much smaller that this attraction is about 165 times less than the other. If we were to substitute for this attraction a web of steel telegraph wires, as in the sun's case, it would answer to put the wires about six inches apart over that portion of the earth's surface which happens to be turned towards the moon.

No other attraction upon the earth is at all comparable with that of the sun and moon; but if we continue to treat the matter in the same way, we shall find that the total attraction of each of the planets, or even of the nearer stars, upon the earth is still a very large quantity when reckoned in tons. Take for instance the nearest star (α Centauri), which is known to be about as massive as the sun, and is, as has been said, about 200,000 times as remote. For this reason its attraction on the earth is 200,000 × 200,000 times less than the sun's; but even this amounts to about a hundred million of tons, and it would require a wire cable nearly 200 feet in diameter, and strained to breaking, to replace it.

Evidently if gravitation were to cease, and bands of steel were to take its place in tying the universe together, all interplanetary space would have to be filled up solid with the metallic fibres.

Another class of facts has perhaps more direct philosophical bearings. I mean those facts which go to show an identity of physical laws and material throughout and beyond the planetary system. As to material, the only astronomical specimens, the only pieces of non-terrestrial matter, which we can actually get hold of for examination are the meteorites which from time to time fall upon the earth. It is perhaps not quite certain that any of them had their origin outside our own planetary system: some scientific students of the subject, of high ability and reputation, are inclined, I believe, still to think that they may be pieces of some broken-up planet, or perhaps independent

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planets, like the little asteroids between Mars and Jupiter, or that they may have been ejected from the sun; and yet the prevailing opinion is that they come from still remoter regions, like the comets, and do not belong to the solar system in any sense. However this may be, there is no question that they are of *extra-terrestrial* origin. Now we find them to contain not a single chemical element otherwise unknown upon the earth, nor any combinations of elements disobedient to the laws of our terrestrial chemistry, though we do find minerals and compounds never seen before or elsewhere. Their whole testimony, not of itself of course by any means conclusive, but relevant and weighty, goes to show a wide-spread identity of matter and of law in the regions of the universe about us.

The evidence of the spectroscope bears also in the same direction, and with a wider reach.

It is hardly necessary for me here to enter into explanations how the light of every shining body carries with it, in the luminous music of its rays, a more or less satisfactory record of its state and nature; but you all know that the lovely ribbon of color which is produced by the action of the prism is generally marked by bands and lines, sometimes dark and sometimes brilliant, characters which more or less completely tell the story to such as can read them. Now I cannot say that the spectra of the heavenly bodies contain no indications of the presence of bodies unknown upon the earth; they do show lines which may (not necessarily *must*) denote the presence of new and non-terrestrial elements. But they always also—and this is the point—show still more strikingly the presence of bodies familiar to us here. The names of many of our familiar metals are written upon the remotest stars as clearly as any monumental inscription. Sirius and Vega exhibit hydrogen as plainly as any bell jar on a chemist's table; and in its luminous qualities the hydrogen of Sirius is identical with the solar, and that with the earthly. The sodium of Aldebaran and the magnesium of Capella sing out in perfect unison with the same molecules upon the earth, without the slightest shade of sharp or flat. So that it seems to me, notwithstanding Clifford's adverse criticism, Herschel and Maxwell were quite justified in their assertion that the molecule, of hydrogen for in-

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stance, bears all the marks of a manufactured article,—containing precisely a fixed quantity of matter, put together in a definite way, of definite dimensions; as well *made* and pitched as any tuning fork, and the same in all parts of the universe yet opened to human exploration.

So also the law of gravitation appears, with the highest probability, to be really universal; the motions of so called binary stars are precisely such as they should be if the same attractions which dominate the planetary system extended throughout the heavens. These double stars move in oval orbits around their common centre of gravity; and when we compute their paths on the hypothesis of gravitation, they follow obediently in the way marked out for them—at least they do so far as we can yet make out, for it will need a longer experience than astronomers yet possess to warrant positive assertions on the subject.

It may be further said that we have not yet the slightest evidence which proves that anywhere among the stars there are physical laws and substances different from those upon the earth. We cannot indeed carry our imitation of solar and stellar conditions to such perfection in our laboratories as to enable us to reproduce all the phenomena revealed by our spectroscopes and other instruments; but we can go far enough to make it evident that there is no need to assume any change of physical law or substance to meet the facts.

Perhaps the phenomena of comets more than any others suggest the existence of materials and forces which transcend earthly experiences; but on the whole, the more *they* are studied, the more probable it seems that we shall yet find on the earth the key to all their mysteries.[1] Time and again it has happened that something or other has seemed to indicate a breaking down of the law of gravitation (as for instance the irregularities of the

[1] The spectroscopic observations of the last few weeks, for instance, upon the splendid comet still shining in the sky have cleared up many points and made it hardly less than certain that the luminous substance is in great part the same as our common illuminating gas. Its spectrum was found, at Princeton and elsewhere, to be absolutely identical, even in some obscure but important details, with that of the faint bluish base of the flame of a candle or of a gas-burner. But the questions how the gas is made to shine, and what forces produce the remarkable changes of form and appearance, remain still unsolved.

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moon's motions in the time of Clairaut, and the perturbations of Uranus before the work of Leverrier and Adams); but in every case the more complete and perfect investigation of the facts has put this law upon a broader and deeper foundation.

And yet it may be said that just at present some things look as if we had about come to the limits of the power of this law as a means of predicting the positions of the heavenly bodies. Prediction involves, of course, the idea of time, and of a measure of time. This measure or unit has generally been found in the rotation of the earth; now certain apparent irregularities in the lunar motions lead to a violent suspicion, and perhaps something more than a suspicion, that this rotation-time—the day itself—is really slightly variable; and that not only in a regular progressive manner, which may be determined and allowed for, but in a spasmodic and irregular way, which cannot possibly be taken into account in predictive calculation. Of course it has long been known that every change in the distribution of matter on the earth is likely to produce a change in the length of the day: every shrinkage of the earth implies an acceleration, every expansion a retardation; so that an earthquake is almost sure to change our time-standard more or less. But until very recently it has been supposed (and has been true too) that such changes were quite beyond the reach of observation; of late, however, it has begun to look as if our power of observation and calculation had passed the limit, revealing irregularities, which would require us to suppose that in some years of the past century the day had been nearly $\frac{1}{1000}$ of a second longer than in others. This, however, is by no means certain *yet*. It may happen, as has so often happened before, that a profounder analysis will explain all the puzzling cases by gravitation simply, without requiring us to admit that our time-standard is really inconstant by an amount which we can detect.

This leads me to call attention to a point which comes in here not so much logically, perhaps, as by mere suggestion, and yet it certainly has its philosophical bearings.

It is this: that in the *strictest sense* even astronomical events are not *scientifically predictable*. What I mean is this: Grant that the astronomer has perfect and complete command of all *possible* as well as all *actual* processes and means of calculation;

grant that he knows the present position and motion of every mass of matter in the universe; we may grant even that he is able to foresee every change which is to occur in the crust of the earth, so that he can allow for the changes in the length of the day resulting from them. Now I say that, granting all this, his predictions, say of an eclipse of the sun a century hence, while undoubtedly they would be very accurate, perhaps within less than a thousandth of a second, would not in the last analysis be *absolutely* precise: because of an unpredictable element which he cannot include in his calculations. I refer to the effects produced by human beings and animals—by *free agents*, in short. Every man who builds a house lengthens the day by lifting the materials above their natural level, and he who demolishes one produces a contrary effect; every train of cars in motion—nay, every flying insect even, while moving, makes some change in the earth's rotation. True, these effects for the most part balance each other, and always are far too minute for any actual observation; but they exist nevertheless. It is not *much* a man can do to change the courses of the stars; but, all the same, he can do something. Insignificant as is the amount of his power, its reach is infinite.

A most interesting series of speculations connect themselves with the distribution of energy through the universe—the heat and light of the sun and of the stars, their amount and variations, the temperature of space, and the probable course of things in the past and future.

If the facts which represent the dimensions of the planetary and stellar system are beyond the reach of human conceptions, the same is equally true of those which represent its energy; whether we contemplate the potential energy of position due to the vastness of the distances and forces involved, or the yet immenser quantity of the so-called "living force" due to the inconceivable velocities and masses of the heavenly bodies, or the molecular energies continually transmitted through space in ethereal waves of heat and light.

Consider the sun alone. It is a comparatively simple matter to measure roughly the amount of energy it sends off every second in the shape of heat, and to express it either in terms of

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some sort of heat-unit, or else by giving its equivalent in miletons, or something of that kind. I presume every one present knows that it gives heat enough to melt a thickness of about fifty feet of ice all over its surface in a single minute,—nearly a foot a second; and that surface is more than 1200 times as great as the earth's, so that this foot of ice, if formed into a column of nearly two miles and a half in diameter, would reach from the sun to the earth. Conceive of it, if you can, this solid massive embankment of polar ice, forming a roadway past the moon and beyond the planets upon which some swift express train might, if drawn by an engine like "long-legged ten," as they call it on the Pennsylvania Railroad, reach the metropolis of our system in about 200 years: now let the solar fire concentrate its fury upon it, and in one single second it is melted, and in seven more has become invisible vapor. How puny and trifling the most tremendous exhibitions of power in earthly phenomena compared with this! Or, to put it another way, the heat continuously developed on each square foot of the sun's surface amounts to about 8000 horse-power, and if applied to the boiler of one of our best modern steam-engines (which wastes about $\frac{4}{5}$ of the theoretical energy of the fuel used) it would run a 2000 h.p. engine, like that which was so conspicuous at the Centennial Exhibition.

Probably our sun is not at all exceptional among his peers. It is quite certain that some exceed, while others fall short of his power.

And now what are we to think of this continuous outpouring of energy, which, so far as can be made out from what is known of the history of life upon the earth, has been sensibly unchanged through the past 2000 years?

Without entering into details, it may be said that at present the plausible hypotheses to account for the facts are reduced to two, which, however, are not mutually exclusive. We must suppose that the heat is chiefly maintained either by the impact of bodies striking the solar surface with astronomical velocities, or by a slow contraction in the mass of the sun itself, or by both. I say *chiefly* because very likely chemical and physical reactions, liquefaction, combustion, etc., may play some real part in the phenomena; but only subordinate and relatively insignificant.

Now the interesting point is this: that on either of these hypotheses the course of nature leads inexorably to an end, and points backward to a beginning—to epochs beyond which the formulæ derived from our present and past experience break down and refuse to yield information.

To use an illustration of Newcomb's. We are in the condition of a man who has come upon a clock going but partly run down. From a little observation he can tell how long it is since it was wound, and how long it will be before it will run down and stop if left to itself; but from the clock itself comes no intimation who wound it, or how or whether it will ever be wound again.

I said a few minutes ago that I could not think of the material universe as a machine wound up and then abandoned by the Deity; and yet many things do look as if this analogy would in some degree apply to the planetary system, as it does to living beings. We find continually—as the rule, and not the exception—beings and systems such that the course of their existence throws no light on their origin, and results necessarily in their destruction; their beginning seems to be of the nature of a creative act; their end an annihilation of what is special in their organization—birth, life, and death. To this category seems to belong the planetary system. No human being, to be sure, has seen the birth of such a system, or witnessed its death; but all that we can now learn shows us that things are moving in a way which indicates that things have not always been, and will not always continue to be, as they are at present.

It is true that long ago Laplace and Lagrange showed that the mutual attractions of the planets would never destroy the system, as some had thought. But this result of theirs was very far from proving the *stability* of the system in the way often represented. In fact, we can see distinctly many causes in operation which must finally result in an entire change of conditions for the earth, and ultimately, unless the course of affairs is somehow arrested in a way we cannot even guess at now, must terminate in its lifelessness or destruction.

First we have the action of the tidal friction, which will never relent until the day has become first a month and then a year in length. Slow indeed the progress of this effect must be

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—very possibly compensated for a while by shrinkage of the earth; but the cause is inexorable, and as long as the water of the ocean feels and responds to the attractions of sun and moon the steady march goes on.

Then, too, the earth is growing constantly though minutely larger. She and all her sister planets, and undoubtedly the sun itself, are gathering up continually the waifs and strays of creation. This growth of the earth is, however, of comparatively little importance, and by itself considered would, however long continued, produce no particular effect upon her habitability. But every meteor that falls upon the earth strikes a blow, and, what is important, more of these blows are received in front than behind. The hourly number of meteors encountered in the evening (when we are behind the earth, and we see only those that *overtake* her) is but about half as great as in the early morning, when we are on the front. It follows, then, that these meteoric impacts produce upon the earth's orbital motion the same effect as a resisting medium, and the ultimate, inevitable issue (unless some other catastrophe forestalls it) is the fall of the earth upon the sun. So far as we can see, the earth's orbit will grow smaller century after century, until it shrinks to nothing; and the same will happen with all the other planets. If, as is likely, the planets are in a sense the children of the sun, the old fable of Chronos will be realized, and he will devour his own offspring.

True, the progress of this collapse of orbits is unimaginably slow, not yet in the least perceptible by observation, but it is incessant.

A few figures will show *how* gradual the process probably is, and I confess the result has surprised me, in being so much slower than I had imagined. I had supposed it might be a foot or so a year in the earth's distance from the sun, but it is nothing like it. On the most probable assumptions I can make as to the amount of velocity of meteoric matter, I find that the change in the radius of the earth's orbit due to this cause must be about $\frac{1}{20000}$ of an inch in a year, at which rate it would take about 100,000 millions of millions of years to bring us to the sun. Evidently a number of things might happen in the mean time. And almost certainly one thing, of great and decisive import-

ance to the planetary system, will happen before the earth has approached the sun a single mile under this meteoric action.

The sun is continually sending out, in the form of heat, vastly more energy than is returned to it from outside; and as the stored-up energy is by no means infinite, though enormous in its amount, the time must come when it will be exhausted. If, as seems likely, the sun has been formed by a process of slow condensation and aggregation, it is perfectly easy to compute how much energy has been developed by its shrinkage from any assumed diameter to its present dimensions, and this energy can be expressed either in foot-tons or in heat-units at pleasure. We find that by its condensation from a ball the size of Neptune's orbit there must have been produced about 18 million times as much heat as the sun now radiates in a single year, and of course we are in a position, therefore, to affirm that if, as seems probable, this condensation has been the chief source of solar heat, our planetary system cannot have been in anything like its present condition for much more than that length of time. If geological investigations are found to demand a greater age for the life of the earth, we shall be obliged to assume the action of other heat than solar. As to the future, the problem is less simple. The present output of solar heat could be accounted for by a yearly diminution of about 250 feet in the sun's diameter, or a mile in 21 years. It is impossible with our present knowledge of the materials of which the sun is composed to make any precise calculations how this rate would vary as the shrinkage goes on, though it is evident that the smaller and denser the sun becomes, and consequently the greater the force of gravity, the less will be the amount of the annual shrinkage necessary to produce the required quantity of heat. But making all allowance for this, and for the possible reinforcements of solar heat by the fall of meteoric matter, it is clear that before the lapse of many million years (Newcomb says about seven) the temperature of the sun must begin to fall, and the conditions of life upon the earth will be entirely changed; and the time must come when the sun will be a dark star, like others which we have evidence of in the heavens, accompanied by a retinue of frozen globes. So far as we can now see, this process must go on throughout the material universe:

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a gathering of scattered matter into worlds and fiery suns, and then a cooling down and freezing up of the masses thus formed. We have not yet any revelation of a resurrection for dead suns and planets, nor has any process of reproduction been found out by which the present race of stellar and planetary systems is to be replaced with new. But then there are more things in heaven and earth than are dreamt of in our philosophy; our ignorance is not the limit of facts or possibilities.

If time permitted we might go on to discuss the much-debated but, I think, barren question of the plurality of worlds; the possible, or rather *impossible*, effects of planetary conjunctions upon terrestrial affairs, and the origin of astrological ideas; or the relation of the velocity and progressive motion of light to our ideas of space and time, so ably set forth a few years ago by an anonymous writer in a little book entitled the "Stars and the Earth."

I should not venture in a place which has not yet had time to forget the voice of Dr. Bowne to say anything on the question whether the axioms, postulates, and theorems of our terrestrial mathematics hold good also for all celestial space, as he (and I too) fully believes they do.

But I close here. Having completed, as well as I could under the circumstances, my tale of words, and filled my little hour, I simply thank you for your kind attention, and leave you to draw the morals for yourselves.

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CONDITIONS OF SPIRITUAL SIGHT.

[A Sermon delivered before the Summer School of Christian Philosophy, Sunday, 17th July, 1881.]

BY REV. AMORY H. BRADFORD, A.M., OF MONTCLAIR, N. J.

Blessed are the pure in heart: for they shall see God.—MATTHEW v. 8.

DURING these days of rest and study in these fragrant woods, beside these silver waters, we have been considering topics to which the thought of men has been directed for ages. Plato with his disciples in the groves of the academy discussed the same problems. Solomon's wail over the vanity of life is full of hints which show that he was stunned and stupefied when he stood on the shores of that sea whose waters reach out to infinity and eternity. Job, as he led his flocks over the plains of Chaldea, and rested at night beneath heavens radiant with intensely burning stars, pondered the same problems, and was puzzled in the same way in which we are puzzled. The questions of to-day are the questions of the ages. The point of observation changes. Minds differ, but all are brought face to face with everlasting mysteries. Each takes his turn at attempting to fathom them, and each ends either in an abyss of scepticism or in coming to recognize that the only solid rock in this world is the rock of faith. To-day we turn from these profound and puzzling inquiries and ask some questions of more practical importance.

Our subject is, *The Conditions of Spiritual Sight.*

The text is one of the diamond texts of the New Testament. It is the opal of the beatitudes: "Blessed are the poor in spirit;" "Blessed are they that mourn;" "Blessed are the meek;" "Bless-

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ed are they that do hunger and thirst after righteousness;" "Blessed are the merciful;" "Blessed are the pure in heart"—that is the crown and climax of all.

Here such a sight of God as is possible on the earth is mentioned among the blessed things, and its condition defined. Let that word "God" represent the whole sphere of spiritual truth. Then we may read the text, "Blessed are the pure in heart: for they shall see, or understand, spiritual things."

Purity of heart is one of the conditions of spiritual sight. Our subject is suggested by this beatitude, although to it our study will not be confined.

What do we mean by spiritual sight? It will be difficult to define with precision our meaning, so we will illustrate. You and I talk about God. We ask, Is there, back of these radiant fields, palpitating skies, changing seasons, and dying multitudes of men, any Being who never changes and who can do all things according to his own will? That question may be answered in two ways. Any man can gather evidences of the existence of God. He sees that all the leaves are curved: strawberry leaves, maple leaves, apple leaves are curved. They grow from round stems, on rounded trunks of trees that all together or in part are a variation of a circle. Nothing ever grows in squares or angles. Life always manifests itself in curves. From the dimple in a baby's cheek to the "big trees" that for three thousand years have faced the tempests of the sierras; from the tiny bell of a lily-of-the-valley to the orbits of planets, comets, constellations, and galaxies, that in solemn silence sail in sidereal seas, the line of beauty is the pathway of the universe. How happens it that everything comes from One mind? Or, take that old saying of the philosophers, *Cogito, ergo sum*,—"I think, therefore I exist,"—and carry it on as philosophers do, and ask, Can an impersonal force produce an intelligent being? In this way you inquire how it is that the eye is adapted to light, the lungs to air; how all faculties are supplied with what they need to exercise their functions. You are brought to the conclusion that design implies a designer. This is simply an intellectual process. It may be pursued by a villain, if he knows enough, as well as by a saint. The best head will gather the best facts. There is a different knowledge of God from that which comes from a pro-

cess of reasoning. In a church of Hartford was an old colored wood-sawyer. He knew no grammar. He had never studied a book. He could not even read. Yet, Dr. Bushnell says, when that old man opened his lips in prayer his language was worthy of Cicero. He believed in God as he believed in his own existence.

The pagan slave Epictetus says, "If a person could be persuaded of this principle as he ought, that we are all originally descended from God, and that He is the Father of men and gods, I conceive he would never think of himself meanly or ignobly." That slave-philosopher, whose thoughts of gold have been beaten out into a thousand modern books, had a clear conception of Deity, morality, and the relation between man and man. How did he get it? By study? No. It was flashed in upon his mind in some strange way. You may call it intuition; but intuition is too broad a word. Let us call it "spiritual sight." By that we mean that there is a knowledge of God, of obligation, an understanding of the claims of religious truth which is not and cannot be conveyed by study, and which comes only to those who are in a certain spiritual condition. This fact is based on the principle that only like can discern like. "When we are like Him, we shall see Him as He is." Only those who are like God can see God. One understands instantly the meaning of sacrifice. Another laughs at it. The second cannot be convinced by argument. The first acts, not because he has passed through an intellectual process, but because of a spontaneous conviction of duty. Every one can talk of God; any one can make an argument to prove his existence. Only those who are like him realize his presence and feel the force of his claims.

What are the conditions of spiritual sight?

I. *Purity of heart.* The secret of religion is locked from those who are not white-hearted. You may fashion syllogisms never so deftly; you may pack into your small heads all the knowledge of all the sciences; you may occupy any position of responsibility or honor; still will you find written over the door of all spiritual attainment this variation of Plato's sentence: "No man can enter here who is not pure in heart." Not the clear-headed, the strong-willed, or the widely read, but the pure, shall see God and understand His truth. What did our Lord mean by this

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utterance? The men whom He addressed were careful to have their sacrifices "healthy, sound, and clean, and whole." To them He said, in effect, "You are careful about the animals you offer on the altars: be careful about your hearts."

Ordinarily purity means freedom from filth. Purity is in character what transparency is in the crystal. "It is water flowing unmixed and clear from the mountain spring. Or it is the white of snow. Or it is the clear open heaven through which the sparkling stars appear. Or it is the pure light itself in which they shine. A pure character is that in mind, and feeling, and spirit of life which all these clear untarnished symbols of nature image in this lower and merely sensible sphere to our outward eye." *

"Create within me a clean heart, and renew within me a right spirit." That is a prayer for the realization of this beatitude.

Moral purity is an indispensable condition of spiritual sight. Sensuality dims the senses. It blackens the glass through which the soul should look to eternal realities. A mind filled with images of evil, through whose silent halls foul and bat-like imaginations fly to and fro, whose thought is not of the everlasting whiteness of God but of what will quickest feed the lusts, can no more understand spiritual things than a worm can understand the splendor of Dante's song. This is simple and plain. Every one knows what it is to have a white heart. There have been certain prominent men who have presumed to lead the world of thought, and to speak with authority concerning religious things, who have no more right to be trusted as guides than blind men as pilots. This rules out of the category of religious teachers all such men as Goethe, and that sweetest and saddest of singers, Robert Burns, and that massive mountain of mind and imbecility whom the world knows as Voltaire. Goethe was a *roué*. The warmest friends of Burns gladly draw a veil over the delinquencies of his moral life. Voltaire was one of the vilest as he was one of the ablest of mankind. "Too late I loved thee, O thou Beauty of Ancient Days," cried Augustine after an early life of sensuality had blunted the fineness of his spiritual perceptions. "I would give ten years

* Bushnell's "Sermons for the New Life," p. 264.

of my life if I could forget the pictures which a youth of wrong-doing has hung in memory," said one of our most eminent educators. Impurity grows in a mind that harbors it as rottenness grows in an apple. One such imagination is a seed from which a hundred fouler imaginations spring. There is no place for a high standard of thought or life in such a man. He may become nominally religious. He may develop a theological bias and make systems with ease, but he will never be spiritually sensitive. The impure cannot appreciate the delicacy of purity. There are lines in it which he never sees. If he cannot appreciate purity in man, how can he enter into communion with the infinitely pure God? A man with dirt in his eyes cannot see the splendor of the stars; and it is equally impossible for him, with foulness in his heart, to see the radiant whiteness of God or God's truth.

II. *Sincerity* is a second condition of spiritual sight. Without it there will be spiritual blindness. We are rocked in a sea of mystery, with darkness before us, behind us, around us. What things are real? Back of the blackness is there personality? Does death end all? How shall we walk without sight? These are awfully real questions facing every earnest man. The answers to these questions are disclosed only to the sincere. Other things may be trifled with, but truth must be approached reverently and with honesty. If you and I expect to be led by the Holy Spirit, we must cease to rely on human leadership. What will this man say? What will this council or assembly of ministers say? What will those persons on whom I am dependent for my daily bread say? These questions must be ignored by those who expect the guidance of God's Spirit. Without any recognition of the right of another to interpose his opinion, without regard to the authority of any name, however great, he who expects spiritual guidance must see to it that all foulness is kept from his mind, and that with perfect sincerity he seeks those things which are from above. It is difficult to be perfectly sincere. Other motives are clamorous. But those great ones whose souls have been opened to truth as the ocean surface to light, have always been those who have dared consequences and followed the inner illumination. In our churches, occasionally, much is done to prevent a man

from being led by the Spirit. He is bound to a creedal statement which, in nine cases out of ten, no man, at the commencement of his life, understands.

The day will some time dawn when we shall cease saying, Believe this, and believe that. We shall seek rather to keep men sensitive to the Spirit, as the glass in the camera is sensitive to the light, and then trust the Holy One to lead his own wheresoever he will. Sincerity, freedom from guile, carelessness of human opinions and motives—these must characterize those who would have that deep conviction of the reality of God and the eternal life which holds a man with all the force of reality. I would rather die for an error which I believed to be true, as Giordano Bruno did, than to sit on a throne and profess what other men call truth, with my heart condemning my voice.

III. The third condition of spiritual sight is *Obedience.* This condition is enounced by Christ in the words, "He that doeth my will shall know the doctrine." It may be said this is begging the question. How can I obey One in whose existence I do not believe, or, at least, of which I am not certain? The question is fair, and yet our position is consistent. We assume nothing that all do not grant. Obedience. Obedience to what? To the light which each one has. Every one has some idea of what is right and what wrong. You may have no clear conception of God or the future life. Very well! Stop thinking about those things. In what do you believe? That justice is right? Then seek to be absolutely just. That purity is right? Then strive so to live that your heart shall be like the driven snow. That it is right to be kind and faithful in domestic relations? Then live to that; and if that is all the creed you have, at least be consistent with it. The only way to receive spiritual light is to commence by honoring the light already possessed. Perform the present duty. Emphasize the present belief. Better do wrong trying to do right than to make no attempt. Carlyle says, "Most true is it, as a wise man teaches us, that 'Doubt of any sort cannot be removed but by action.' On which ground, too, let him who gropes painfully in darkness or uncertain light, and prays vehemently that the dawn may ripen into day, lay this other precept well to heart, which to me was of invaluable service: 'Do the duty which lies near-

est thee,' which thou knowest to be a duty! The second duty will already have become clearer." Obedience is the only way many of the profoundest lessons can be learned. "Love your enemies, bless them which curse you," said the Master. Is the lesson learned when the words are committed? No, it is not learned until, following in the footsteps of the Master, you and I have put into practice that lesson. "Love your enemies." What does that mean? You know not so long as there is one person to whom you are not willing to go as Christ comes to you. How am I to learn forgiveness? By forgiving those who have injured me. How am I to learn what the Atonement means? By studying the philosophy of it, and calling it governmental, or moral influence, or expiatory, or what not? No. To do that, and that only, is to know no more of the sublimity of its meaning than the child who dips her hand in the sea can know of the teeming life and measureless spaces of ocean depths. To understand the meaning of Christ's sacrifice, we must sacrifice. I am willing to say that no man knows what the Atonement means until, in the likeness of Christ, he has given himself for those who have nothing to give in return. Go to the one person towards whom you have most reason to feel unkindly —a person who has lied about you, insulted you, betrayed you, and violated every claim upon your care and regard. To that person go, speak to him kindly, treat him as if he were your own brother, and keep on doing that until he is conquered or you are dead, and then you will know something of what the Atonement means. The Christian doctrine of sacrifice can be understood only by obedience to its demands. Obedience is essential to an understanding of spiritual truth. It is also essential to the reception of it.

Not far from the Rhine, in majestic splendor, stands the grandest of modern temples. Massive walls, graceful pillars, forests of arches which seem to have been caught from some primeval forest, hideous gargoyles, flying buttresses, windows red as blood and golden as light, angel choir, solemn nave, and lofty spires that seem to reach the sky,—a poem in stone,—beside that grand old river rises the cathedral of Cologne. But it is not so grand as the work of pastor Fleidner in the humble little town of Kaiserwerth, almost within its shadows, where is one of those rare institutions which give faith in God and hope for

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man. A humble clergyman and wife, when their people could no longer support them, went to England for help. There they met Elizabeth Fry and went with her into the English prisons. Their hearts were touched with a coal from the altar which had fired her heart. They returned to Germany. Now mark the growth. They were young. They knew little of life and nothing of philosophy. They commenced to do for the first who needed help. Two outcast women, turned from prison, could find no home. They were taken by pastor Fleidner to his house. Obedience brought new revelations of the meaning of service. The sphere of activity grew until now their training-school for nurses, their mission-house, their orphan and insane asylums have become stars whose radiance meets around the world. Obedience is the condition of knowledge. Kindness, justice, purity, charity, are right always and everywhere. For one, I have no faith in the spiritual illumination of any man, though his head contain the brains of Bacon, or his place in the church be that of preacher or pope, who has not learned that he must be kind, pure, just, and charitable. If a man is not obedient to the knowledge which he has, he can never have trustworthy revelations of higher knowledge. If a bad man tells you he believes in God, you wish he would act it more and talk it less. But he acts all the knowledge he has.

IV. *Self-Surrender.*—Spiritual sight concerns itself with things outside of us, most of them to the physical sight invisible. You cannot see the stars by looking at your hands. You cannot appreciate the beautiful in conduct or character by wondering whether the world is giving you your dues or not. No one is less to be trusted in spiritual things than the egotist. He knows all there is to know already. He is receptive of nothing from heaven above or earth beneath. Centred in himself, how can he hold the windows of his soul open? The selfish man, always more anxious to receive all that belongs to him, and to gain all that he can, than to be generous, never having a good word for others for fear that some one else will get more attention than himself, always looking out for slights, and fancying them where they are never intended—such a man may have good qualities, but he can never receive special spiritual illumination. The generous soul is the open soul. Hence, while great leaders in philosophy, as Bacon, in literature, as Dr. Johnson,

in the movement of nations, as Napoleon, have been egotists, the great spiritual teachers have been those who have learned the lesson of self-forgetfulness. "I have learned in whatsoever state I am, therewith to be content," cried the apostle Paul. Sakya Muni, the Buddha, who has made the religion for a third of the human race, left the splendor of a royal court, spent his days where he could feel the beating and the breaking of human hearts, gave himself to find a way of escape from the "ever-changing wheel of nature and of pain." The Orient, which has followed Buddha, has been led in a faith of purest morals by one who, though he never heard of Jesus, walked the same path-way of self-denying service for his fellow-men. And our great Master! What words describe Him, the world's supreme moral Teacher and spiritual Instructor, like these: "He made himself of no reputation; and, being found in fashion as a man, He humbled Himself and became obedient unto death, even the death of the cross"? All who would receive light from God must follow in His footsteps. Man is but an atom in the universe, not its centre. But the selfish man will make dogmatic statements about God and eternity, as if the Almighty were in the habit of consulting him about the management of the universe. He is not to be trusted. Close by his side, hardly daring to look up, is one who makes no pretensions, who realizes that an individual is to the universe less than a drop of water to the sea, but to whose quiet hours have come visions of truth, duty, and the possibility of goodness of which the former never dreamed. To such God reveals himself.

These four words epitomize the sermon to which you have thus far listened: *Purity*, *Sincerity*, *Obedience*, *Self-Surrender*.

These are conditions of spiritual sight. God may reveal truth to a man who knows nothing of books, as he did to Job; to one who is no philosopher, as the apostle John; but he never reveals spiritual things to those who are impure, insincere, careless of duty, or selfish. I do not underrate knowledge and culture. A wise man who is pure in heart is better than if he were ignorant. But I want to record my belief that many who have no time for study, whose lives are lives of drudgery and pain, of whom the world never hears, have visions of God and the mystery of his service of which the masses are ignorant.

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Purity, sincerity, obedience, self-surrender,—these are the marble steps that lead to the spiritual temple.

Three lessons naturally follow.

(1) If what has been said is true, then the best teacher of spiritual truth, other things being equal, is the purest and truest man. Any man who seldom opens a book, *if he is purer in heart*, is a better guide for spiritual things than Jonathan Edwards with all his theology, Professor Huxley with all his scientific acumen, Neander with all his historic research, or Herbert Spencer with all the powers of his philosophic mind. Not learning, but goodness, is the world's best teacher. This is not the world's way of looking at it. Innocence is almost synonymous with weakness. Queen Caroline with a diamond wrote on the window of her palace, "Lord, make others great, keep me innocent." The world's best teacher of its profoundest mysteries is the world's purest man. It is no time to discuss the question of the relation of science and religion. It is enough to say that when Tyndall, Huxley, Mivart, speak of physical science, it is time for you and me to be still. They are kings in their own realms. But I do want to emphasize that because some one is learned in other things he is not therefore to be trusted as a religious guide. The scientist, because he is a scientist, has no right to a feather's weight of influence in religion. The Christian, because he is a Christian, knows no more about the origin of the world, or the laws that govern it, than if he were not a Christian. That beatitude needs angelic emphasis: "Blessed are the pure in heart: for they shall see God." Newton may instruct in science, Niebuhr in history, Hamilton in philosophy, Beethoven in music, Angelo in art, Calvin in theology, but it is the pure in heart that see God and know spiritual truth. Tennyson's lines on the dwellers in the spirit-realm may be applied to spiritual truths:

> "How pure at heart and sound in head,
> With what divine affections bold,
> Should be the man whose thought would hold
> An hour's communion with the dead.
>
> "In vain shalt thou, or any, call
> The spirits from their golden day,
> Except like them thou too canst say,
> My spirit is at peace with all.

"They haunt the silence of the breast,
Imaginations calm and fair,
The memory like a cloudless air,
The conscience as a sea at rest:

"But when the heart is full of din,
And doubt beside the portal waits,
They can but listen at the gates,
And hear the household jar within."

(2) There came to my study a few years ago a man without work and not able to work, with a large family of his own, and a blind father dependent on him. I asked him his name. He gave it. I asked him how to spell it. "Well," said he, "to be honest with you, I have never been to school a day in my life. I have always had to work early and late, and I don't know how to spell." It was no fault of his. Into such hearts come longings for God as real as into yours or mine. They bury their dead with tears as sincere as ours. The tremendous reality of the future they face with inquiry as eager as ours. It is not of the rich, the wise, the strong, the successful; not of those who can say with Whittier,

"I listen to the Sybil's chant,
The voice of priest and hierophant;
I know what Indian Kreeshna saith,
And what of life and what of death
The demon taught to Socrates,
And what, beneath his garden trees
Slow-pacing with a dream-like tread,
The solemn-thoughted Plato said; . . ."

nay, it is not written of any of these, but of the pure in heart, they shall see God. Therefore the poorest, the weakest, the humblest man that walks the earth may enter into communion with the Deity.

(3) Professor Tyndall, after almost superhuman exertions, climbed the Matterhorn, and, standing upon the summit, where few have ever stood or will stand, his mind ran back to the beginning of creation, back to the star-dust out of which he imagines all things to have been evolved, and he asks, "Did that formless fog contain, potentially, the sadness with which I regard the Matterhorn? Does the thought which now runs back

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to it simply return to its primeval home? Such are the questions, without replies, which run through consciousness during a ten minutes' halt upon the weathered spire of the Matterhorn." Questions equally mysterious meet us everywhere. We live, as birds and beasts and insects live,—to die. We put our thoughts into buildings, books, machines; and the buildings stand, the books are read, the machines run on, when we are formless dust. We reach eternity with aspiration, and grasp only the facts of an hour. Oh, my friends, let us be honest with ourselves! Let us covet the best gifts. Let us not shut our eyes to facts even though we understand them not. We walk between graves. Stars shine on when men are gone. We love, and love's chains are broken as rudely as any others. We are made for happiness; and yet Augustine's words are true, "God hath had one Son without sin, but never one without sorrow." Every heart sometimes drops blood; and when we ask, Does no one see? Can no one help? the waters ripple, the stars shine, the trees whisper, the great world "spins down the grooves of change," and no answer comes from one of them. Who can know anything of what every one longs to know? To those only who are pure, sincere, obedient to the light they have, unselfish, comes the divine voice of the Divine Teacher. Then how may we become pure, sincere, obedient, unselfish? Almost in a word can we answer: Become a disciple of the only pure One who ever walked this earth. Would you become brave? Read Plutarch, and the dauntless heroism of those warriors of the elder ages will fire your soul with their fervor. Would you be a philanthropist? Study the splendid self-sacrifice of Howard and Pastor Harms; fall in love with Florence Nightingale, treading the ghastly wards at Scutari, while bleeding soldiers kiss her shadow as if an angel had passed, and their example will become your inspiration. Would you be pure in heart, sincere as light, obedient and self-sacrificing? Then study the words, imitate the example, fall in love with the person, and spend all the time you possibly can in the presence, of Him who is the Brightness of the Father's glory; and as roses and violets absorb their colors from the sun, so you will become white with the radiance of Christ's purity, and in his light the mysteries of earth shall melt into the changeless realities of the Better Land.

THE FOUNDATION OF CHRISTIAN BELIEF.

[A Lecture delivered before the Summer School of Christian Philosophy, 19th July, 1881.[1]]

By Rev. Lyman Abbott, D.D.

WE have come into an epoch in which the fundamental truths of Christianity are being called in question; an epoch in which the faith of not only a few but of many is being shaken if not overthrown; a time when it behooves us to inquire into the very foundations of the Christian faith; into that on which the our faith is based, and out of which our faith grows. The scepticisms of today are not like the ripple on the surface of the water; the great waves plow deep, though the Christian believes there is in religious experience, as in the waters of the ocean, a line below which the waves do not go, where there is a deep and abiding peace; and it behooves us to find out where this line is, and wherein consists the power of this deep and abiding peace. The questions that are perplexing the minds of the people today are not respecting the details of religious belief or ceremonial; these questions have been cast aside altogether. It is no longer a question whether God exists in three persons or not, but whether there *is* any personal God; not whether men shall pray by the prayer-book or by extemporaneous prayer or by silent aspiration, but whether there is any such thing as prayer; or whether that ladder reaching from earth to heaven,

[1] The Rev. Dr. Abbott's address was delivered extempore. The report here furnished was phonographically reported by Miss Charlotte Reeve.

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on which innumerable angels are ascending, carrying our prayers up to God, and descending, bringing answers of peace, is but the ladder of a dream from which we are to awaken to find our heads pillowed on the stone. These are the questions which unbelief is asking to-day, and which we must be prepared to answer. Nor is this unbelief confined to those who rejoice in unbelief and make war upon Christianity. It is an atmosphere that is pervasive. There are signs of it in the church, in the Sunday-school, in the home circle, in the religious press, in the form and fibre of religious teaching. You find men who are rejoicing to throw away the sanctions of religion, yet you also find men, and not a few of them, who long to hold with tenacious grasp the faith of father and mother, and yet find it slipping away from them. Religious experience seems to them like a delicious dream; but they are awakening from it and they cannot go to sleep and dream it again if they would. There are ten such sceptics where there is one rejoicing unbeliever. We need in such a time as this to re-ask ourselves the question, Why do we hold to the Christian belief? What is the rock foundation on which it is based? And we need to ask it the more because the quest of the age is a quest after a more sure foundation than that which has been recognized in times past.

Up to the sixteenth century the church was regarded as the foundation of Christian belief by the great mass of the people. They believed the doctrines of Christianity because the mother-church told it to them. But the church is with the great mass an authority for Christian faith no longer. We refuse to accept the truth simply because the mother-church tells it to us. The human race has grown too large, too strong, too independent in its thinking to take the declaration of pope, or presbytery, or council, or church as the foundation of faith. You might better pluck the blossom off the tree and attempt to crowd it back into the bud, or catch the eagle that flies in heaven and attempt to put it back into the shell, or take the full-grown man and put him in long clothes and rock him in his mother's cradle, than attempt to put this nineteenth century back into the clothes, or shell, or bud of the sixteenth. There was truth

in the sixteenth century, but we will not hold it simply because the church declared it. When the church was swept away as the basis of Christian faith men began to take the Book, the Bible, as the foundation on which to build. For many years men were content to go back to the Book and say, "It is true because the Book says it." Now, whether you may be glad or sorry, that period is passing away and we cannot prevent it. The Bible is not the foundation of faith that it was a hundred years ago. Then when a minister was preaching a doctrine, all he had to do was to cull his proof-texts from the Bible to support it. To-day the enlightened minister can no longer quote his proof-texts to show that his doctrine is true. The mere citation of texts will no longer carry conviction as it did then. The ancients believed that the world rested on an elephant; and when asked what the elephant rested on, they answered, a tortoise. For a long time men believed that the world rested on the church; and when the question was asked, What does the church stand on? the answer was, "On the Bible." Now men are beginning to ask, What does the Bible stand on? Deep down beneath both book and church there is some solid foundation, and we must find out what it is. The Brooklyn bridge rests on two immense stone piers, and the child looking at it says the bridge depends upon these two abutments. But the man knows that deep down below the river-bed is the solid foundation-rock on which the abutments are built. So the Christian faith is supported by these two abutments, church on one side and Bible on the other, yet deep down below these lies the rock-foundation on which these are built. What is that foundation?

The fundamental article of the rationalistic creed is that we get all our knowledge through the senses; that we *know* only what we see, hear, touch, smell, and what we deduce by the reason from the facts that are testified to by the senses. The fundamental article of the Christian faith is that our profoundest, more trustworthy knowledge, comes not from observation, nor from deductions of the reason; that we arrive at it, not by perceiving, nor by conclusions from what we perceive, but immediately and directly. We know the higher truths by personal

experience. The evidence of them is immediate and in our own consciousness.

A farmer and his daughter go out to walk in the field; she gathers a handful of daisies and, holding them up, says, "Are they not beautiful?" and the father says, "Tush! child, they are mere weeds; I wish I could get them all out of my field." How shall the child, who is wiser than the father, demonstrate that there is beauty in the daisy? Is there any argument by which the child, who sees the beauty, can demonstrate it to a leaden-headed man who does not see it? You go to a philharmonic concert and you hear one of Beethoven's magnificent symphonies rendered by the orchestra; you listen till your whole soul is filled with the beauty of the music; you turn to the companion at your side and say, "Is it not exquisite?" He replies, "Well, yes, I suppose it is for them that understand it; but I never could enjoy classical music." By what argument can you demonstrate to him the grandeur of the music? No mechanical or scientific or argumentative process, or any other process known to men, can make him see music which is not echoed in his own soul.

As with our knowledge of æsthetic truths so with our knowledge of moral truths; they cannot be demonstrated to us; they are matters of deduction; they are matters of instantaneous perception. How do you know that there are such things as truth, honor, justice, purity, love? Did any one ever see them? did any one ever smell them or touch them? Are they hard or soft? Do they weigh so many ounces? Can you bray them in a mortar? Can you analyze them? Can you test them by any scientific tests? Why, if a politician says, with Walpole, "Every man has his price," you cannot prove patriotism to him, but you will not vote for him. If a man says, "I do not believe there is any such thing as love," you cannot prove to him that love exists, you can only look pityingly upon the man who has never known a mother's love, and who has been left without one genuine friend. When a man says, "I do not believe in honesty," you do not stop to debate the question; you keep your hand on your pocket-book till you are out of his presence; for a man who does not believe in honesty is already a

thief. The moral truths are recognized by the moral perception instantaneously. If a man does not recognize them it is because he lacks the moral sense.

Now that which is true in the æsthetic and in the moral realm is true also in the spiritual realm. The foundation of our belief in them is our personal experience of them. We *know* them. How do we know there is a God? From the existence of design you may conclude that there was a designer; but argument never demonstrated to any one the existence of a God who is a Father, who exercises compassion and tenderness towards his children, and who loves them, and whom they may love. You know scientists tell us that the phenomena of light indicate that the whole universe is full of a subtle ether; no man has ever seen it; no man has ever analyzed it; but they conclude that the universe is full of this ether, the vibrations of which produce light, because this hypothesis is the best explanation of the phenomena of light. By and by some scientist may arise and offer a better explanation, and then the old hypothesis of either will vanish away. So long as a man only concludes that there is a God because God is the best explanation of all phenomena around him, he is resting on no sure foundation, and he who will bring him a better explanation will take his God away from him.

We believe in God not because argument has proved him, but because we have in ourselves the consciousness of his presence. He has been our comfort in sorrow, our strength in weakness, our light in darkness. We believe in God because we have felt in our own life a power not ourselves that makes for righteousness. Why do you believe in mother? Because you have seen your mother? I beg pardon; you have never seen your mother. You have seen the face, the eye, the brow, the lips, the form; but that does not make mother. If it does, then why, when the form lies prostrate on the bed, and you look down on the eyes that never before refused to look into yours, and you press your lips to those that never before refused to press on your lips the kiss, and you call the name that you never called on before without getting the response, why is it that the tears gather in your eyes and the grief surges

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in your breast? Are the eye, the brow, the lips, the form, mother? No; mother is gone though they are there. It is the love, the tenderness, the compassion, the long-suffering, the self-sacrifice—these make mother, and these no man ever saw. And no man has ever *seen* any of all the best and sweetest things known to our humanity.

We believe in our immortality not because the arguments addressed to us prove it; but, as the bird believes in its power to soar in invisible air even before its wings are fledged, so we feel within ourselves the consciousness that in our souls there is the power of flight that shall show itself when once the cage-door is opened and we are allowed to fly out from behind our prison-bars. The Christian believes in Christ not because of philosophical arguments or proof-texts, but because when we attempt to bring before us our own puny conception of God, it fades into nothing before this glorious portraiture of divine life. We believe in Christ's atoning sacrifice, because when we come to this story of One who has suffered and died for us, the load is lifted as the load was lifted from the shoulders of Bunyan's Pilgrim, and we see it no more.

The great truths that God is, that we are sinful, that he has provided for our redemption, and that he fills us with his divine life, rest on the testimony of our personal consciousness. And it has the testimony not of a single witness, but the concurrent testimony of many witnesses. It is not that a single man imagines that he has received strength and comfort from without, but all through the ages men have been experiencing this divine flow of soul. Men call Christianity a dream! If it is a dream, then hundreds of thousands all through the centuries have been dreaming this same dream, and those who have been the most unhappy and the most pernicious of the race have been those who have had their dreams broken.

Go with me to-day around the globe, and you will find in the woods a man lifting up his heart unto God wholly unable to utter his experience in words; in the log-cabin a little company singing their praises unto God; in the Roman Catholic cathedral, with its vaulted roof, its pictures and its statues, one telling off her beads, kneeling on the hard stone floor; then in the

land where no message of the gospel has ever come we will find one and another and another clasping his hands and throwing out his heart's cry, longing for help, looking up to an unknown God. But whether in the leafy silence of the wood, or in the Quaker meeting, or in the Methodist gathering, or in the Episcopal Church, or in the Roman Catholic cathedral, or in the uncultured poor blind prayer of the pagan, everywhere shall come back some answer of peace and life, everywhere a testimony in consciousness to the grace of a helpful loving Father—God. This globe is encircled with the testimony of myriads who bear witness in their own personal consciousness to the truth of a God that sustains and comforts and pardons and inspires and fills with life. That is the foundation that lies under both church and Bible that is the foundation of our belief. Of all fears, the fear of a victorious infidelity seems to me to be the most foolish. Some articles of your creed may go, and your creed be better for losing them; but the great fundamental facts attested by human experience and by the world's history never go. They will last as long as humanity itself lasts, because it has been thoroughly wrought into the nature and experience of man.

Men call this scepticism a fog, and so it is. In August, when in Orange Co. the grass is sear and yellow, the flowers are all wilted and faded, and the trees hang their leaves in fear and sorrow, if you will go to Newport, there you will find the grass green, the flowers fresh and fragrant and bright, and all the trees of the forest clapping their hands; because every week God puts his hand into the Atlantic ocean and takes up the water as in a sponge, and holds it over the land, and squeezes it there until every leaf of every tree has drunk its fill, and then sweeps it back again into the sea. So when God shall have accomplished all his will out of this age of doubt and interogation, and shall have swept back the fog into the sea, there will not be one blade of grass in all God's garden that will not stand out the brighter.

Men call this scepticism a tidal-wave; and so it is. The child and the man stand on the shore of the Bay of Fundy, and when the great wave comes rolling in the child cries, "Run, father,

run! the ocean is going to wash the world away." The father smiles and says, "Wait, child, wait." Then the great wave breaks into atoms of foam and rolls back into the sea, and the rock remains unchanged. So when the great tidal-wave of scepticism shall have fulfilled its mission and rolled back, the Rock of Ages shall stand fast in human experience through all time to come as it has stood firm in all time past.

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FREEDOM OF WILL EMPIRICALLY CONSIDERED.

[A Paper read before the American Institute of Christian Philosophy, 26th January, 1882.]

By John Bascom, LL.D.,

President of the University of Wisconsin.

IT is not our present purpose to present again the proofs of liberty in human action. These proofs are so primitive in their character, approach so nearly the first principles of reason, that later discussions of them between the defenders of philosophical systems do not often subserve any purpose of conviction.

The object we now have in view is a consideration of liberty as it offers itself in experience, first, in the relation of the mind to the brain; and, second, in the reaction between the powers of the mind and the products of those powers in the world about it. If we were to grant liberty theoretically, should we find its exercise possible under our present experience? This is the question we wish to answer.

It will not be amiss to remind ourselves in starting of the nature of the interests involved in this discussion of liberty. Moral facts are supreme facts in human society. The axiomatic principle on which these rest in the general mind is, Responsibility is commensurate with power. This involves at once choice as the indispensable condition of virtue. We are not considering in morals a balance of tendencies, but a balancing of tendencies—a dealing of the mind with tendencies. No adverse statement at this point has weakened the general convictions on which morality proceeds, or presented itself as more

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than an ingenious evasion of them. Virtue and liberty rise and fall together; whatever the one loses the other loses also.

The same relation belongs to truth and liberty. Truth is to be inquired into and sought out. It may be attained, and it may be missed. That movement of mind, therefore, which is to be occupied with this work of inquiry must be flexible and spontaneous; must be at liberty to guide itself by the purely intellectual laws of logic. If thought is in any way subjected to forces beyond itself it can no longer shape itself freely to its own conditions. Conclusions reached under a physical necessity have nothing to do with truth. They are facts, not truths. The laws of logic are not laws in this sense, the mind must move logically; but in this sense, the mind must move logically if it is to reach the truth. The implication is that the mind may easily move illogically, and miss the truth; that it shapes its own movement to its own object; that it is free, and that truth is the reward of freedom wisely exercised.

The beauty of the world involves a like conjunction of liberty and activity, though less obviously so. Beauty is fitting thought and feeling rendered in a form wholly suitable to them. Its pursuit involves, therefore, an ideal, and a spontaneous movement toward that ideal. Impulsion and force are alien to beauty. Attraction and freedom are of its very nature.

Nor, indeed, does the plain idea of serviceableness—rendered as man always will render it—lack this notion of liberty. The world is made up of forces that may be used, and of powers in man that may use them. It is made up of the fixed and the flexible, and neither term can be lost and the serviceable process remain. State the case strictly under the forms of empirical forces, and not only do virtue, science, art disappear, use also disappears. We use things in this higher sense when we shape them to our purposes. We use air not when we breathe it spontaneously, but when we fill our air-brakes with it. We use water when we convert it into steam in our boilers, rather than when we drink it under an organic impulse. If the world, both in matter and in man, is made up of forces under settled laws of interaction, man no more uses matter than matter uses man. If we include in the natural what is causal and fixed, and in the supernatural what is free and flexible, the natural can

never be in any way handled or interpreted or used without the supernatural. Whenever interpretation reaches either comprehension or use it must do so by virtue of the supernatural, and in behalf of the supernatural. To these ideas of knowledge and of service the one is as necessary as the other. The knowing and using agent is not at the same time and in the same relation a part of the thing known and used.

Human knowledge and human liberty, fundamentally planted in this union of the physical and spiritual, as we here conceive them, show empirically two lines of limitation. The first of these appears in connection with the brain, the medium by which the mind receives influences, and the instrument by which it communicates energies. We may pass at once to the extreme conclusion which science is approaching, that the nervous system in man, with its great centre, the cerebrum, is constructed throughout with definite lines of inner and outer movement. Organic connections differ from mechanical ones in admitting a greater variety of offices, and allowing a freer substitution of one organ or one method for another; yet a distinct constructive purpose rules an organism as it rules a mechanism. The definiteness of the nerves and of the exterior termini of nerves in the nervous system carries with it a corresponding definiteness of offices both in them and in the great nerve-centres. Exactness in superficial relations without exactness in interior ones would be futile, the meaningless juncture of order and disorder. The distribution and precision of the surface indicate like exact inner relations in completion of the one plan. Observation of the effects of obstruction and of disease in the brain, and of artificial irritation of its different localities, serves also to disclose explicitness of office combined with organic flexibility.

There is nothing in this which liberty may not easily accept. This dependence of the mind on the body gives strict conditions to liberty, but does not take away its first terms. The tool is an instrument to the hand; the hand is an instrument to the brain; the tool, the hand, and the brain are conjoint instruments to the mind. The workman cannot go beyond the possibilities of his tools. His circuit of liberty lies within those possibilities. The mind united to the body receives from it

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what we may call two sets of limitations, or two sets of powers as we choose to regard them: those which pertain in the senses, to the ingress of knowledge, and those which pertain in the muscular system, to its egress in action. The nervous system is the medium in each case, and the bond between the two.

The only view which at all interferes with liberty at this point is that which regards all action in consciousness as a secondary accompaniment of this interplay of stimuli and activities in an organism, and so determined in its phenomena by it. If the chief nerve-centres, more especially the cerebrum, in man are the seat of a series of interactions which take place between the inward movement and the outward one, and are governed by them; if the phenomena of consciousness are simply the accompaniments of these complex actions and reactions in the brain, then liberty is lost, not limited by such conditions.

The adverse reasons are many. (1) A very large share, much the largest share, of nervous interplay goes on both in the lowest and in the highest life without consciousness. Consciousness is certainly no necessary product of merely nervous interaction. (2) Consciousness regarded in this light is from beginning to end a superfluous term. If consciousness is incident to forces seeking directly their own ends, we have no more use for consciousness in living than in dead things; no more need of it in securing the muscular activities that follow thought than in the circulation of the blood, or in uniting the recognitions by the eye of the characters on the printed page with the muscles of the throat in articulation. If no state of consciousness is of itself productive of subsequent states of consciousness, but all are alike dependent on underlying cerebral conditions, then each state of consciousness and the entire series of states are, in reference to physical events, supernumerary results. Between these states and these events it is impossible to affirm any correspondence which is of the nature of knowledge. (3) Consciousness has been introduced in development, on the contrary, as a new term in a higher life, incident not simply to organic relations, but one that seems greatly to extend them and put them to new service. (4) There is no known counterpart of any given thought in any given molecular changes of any nerve substance. The first and fundamental step of proof

in this direction has not yet been taken. The whole theory of correspondence has not one explicit fact to sustain it. The senses are definite in their outer conditions and inner impressions; the activities are definite in their inner conditions and outer effects; but our experience does not extend or cannot extend to any pure mental state as the exact counterpart of a physical one embraced between these two lines of ingress and egress. Arguments looking to such a conclusion are all inferences from insufficient grounds.

There are two contrasted views that we may take of the relation of the processes of pure thought to cerebral action. We may regard them as strictly incident to cerebral changes which intervene between sensation and action. This supposition implies an exact and causal connection of each specific cerebral state with a corresponding state in consciousness. The line of efficient forces is thus maintained in the physical world. Or we may regard pure intellectual activity as a distinct term, under its own laws, which is introduced between sensor impressions and muscular actions, as the musician is an independent agent between the sheet of music that lies on the piano and the instrument itself. On this supposition the mind as mind receives impressions, correlates them in its own fashion, arrests them or passes them on in effect according to its own ends. We may, if we choose, modify this second opinion by still further supposing that there is a distinct molecular state of brain as the necessary accompaniment of each thought, but that it is secured by existing states of mind and not by antecedent sensations. This expansion of the theory, however, seems to be a weak concession to physical ideas, as no such correspondence can be proved, and the cerebral states thus accompanying pure thought would have causal connections neither with antecedent nor subsequent cerebral states, would be a dead term in the material world, and serve no known purpose in the mental one.

Several empirical reasons are urged for the strict dependence of thought on cerebral states. In insanity, it is said, the mind is subverted in its action simply by disease of the brain. But this it should be under either view. The mind is dependent for its facts or supposed facts on a nervous organism, and an abnormal state of the organism may wholly alter the data of thought.

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The quickness, however, and accuracy with which the patient reasons from his premises are often very observable. If the sensor and active physical powers are broken down by disease, the mind on the one side loses data, and on the other side the power of expression. Aphasia, or the inability to utter or to write words, is often offered as proof of this dependence. This fact, however, seems to look in the opposite direction, as the idea is still grasped by the mind even when it cannot control the organs of utterance.

But the experience which looks most directly to a constant and complete dependence of thought on cerebral conditions is the sense of fatigue and the waste of nerve-tissue which accompany the action of mind. This fact requires careful consideration. Under all theories the brain is the medium of impressions and expressions, and the action of the mind lies between the two. The only question is whether it lies as intervening cerebral links between cerebral states, to which connections thought is incidental; or as a relatively independent spiritual power to which no cerebral state need be set apart. In either case the action of mind involves sensor activity and motor activity, and this, too, in a much higher degree than is usually thought. It is this incipient or complete ministration of sensor and motor action of the brain to the mind that we would regard as a sufficient explanation of the fatigue of mental activity.

Things and words are the counters of mind, and without them it can make only the feeblest advances in reflection. But things are sensor impressions, and our acts of attention, analysis, and arrangement are sensor impressions and motor activities. The sensor and motor terms are as omnipresent in inquiry as are the two poles in an electric current. Still more if possible is this true in the use of words, the most intimate and constant means of thought. When the words of others direct us, they become sensor impressions that call for careful attention. When we ourselves guide our thoughts by words, they are either distinct motor terms or *quasi*-motor terms.

All acquisition commences with language and seeks its constant aid, and as language has a definite cerebral term involved

in its use and expression, we find in this fact an occasion for a consumption of nerve-tissue in all mental action. Children, if circumstances admit the habit, prefer to study aloud; that is, to aid the comprehending process by a full use of its counters. If the habit is inconvenient, the pupil will often move his lips without emitting any sound. He still finds the incipient utterance of the accompanying words a help to the mind. Some adults are aided in understanding a book by reading it aloud. All persons observe the much greater clearness of thought which follows the utterance of one's conclusions, or the writing of them. Even dreams frequently lead to talking in sleep. All these things show that it requires considerable effort on the part of the student to reduce the language which he employs in thought to its lowest terms in nascent expression.

A little attention to our mental processes will show us that language never disappears in thought, but that our most silent processes still go forward by its aid. This dependence of thought on expression is also well illustrated in the education of mutes. "Though the deaf-and-dumb prove clearly to us that a man may have human thought without being able to speak, they by no means prove that he can think without any means of physical expression. . . . Herein lies the necessity of utterance, the representation of thought. Thought is not even present to the thinker till he has set it forth out of himself. . . . The deaf-and-dumb gesticulate as they think. Laura Bridgman's fingers worked, making the initial movements for letters of the finger-alphabet, not only during her waking thoughts but even in her dreams. . . . Heinicke gives a description of the results of his teaching his pupils to articulate, their delight at being able to communicate their ideas in a new way, and the increased intelligence which appeared in the expression of their faces. . . . The teachers of Laura Bridgman used to restrain her from making inarticulate sounds, but she felt a great desire to make them, and would sometimes shut herself up and 'indulge herself in a surfeit of sounds.' But this vocal faculty of hers was chiefly exercised in giving what may be called name-sounds to persons whom she knew, and which she would make when the persons to whom she had given them came near her, or when she wanted to find

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them, or even when she was thinking of them. She had made as many as fifty or sixty of these name-sounds."[1]

These cases indicate the aid which the mind immediately receives from any method of expression, and the consequent pleasure it takes in it.

We are also to bear in mind the greater fatigue which attends on thought when it receives full, vocal utterance, as in oratory. The accompanying activity of the nerves and organs of articulation with the necessity of continuous and rapid expression make the fatigue very great.

This labor is also much increased if the subject discoursed on is one whose vocabulary we have not fully mastered, or if the discussion is carried on in a language with which we are not perfectly familiar.

On the other hand, an exact but familiar process, as the multiplication of large numbers, is much more trying if we are compelled to carry it on mentally, and are not allowed visible counters. In this case the steps are no more difficult, but the difficulty of retaining them is greatly increased.

Mere reverie, in which the transitions are very loose, is restful rather than fatiguing.

The power to utter words by rote, into which complete memory is constantly passing, is plainly acquired by a nervous and muscular training. A memory which easily lays hold of an idea, but retains with difficulty the precise words in which it is stated, is doubtless to be explained by diversity in the cerebral conditions of language; as much as is hesitancy in speech as contrasted with volubility. Memory is evidently much modified by the fact that it so often involves the physical condition of expression.

If we allow an exact correspondence between cerebral condition and pure thought, we confound the distinction between instinct and reason. Instinct is plainly characterized by a direct connection of external stimuli with appropriate actions; the transition being, however, more or less protracted, and united with the ordinary variable experiences of life. Reason, under the view now combated, would be simply an extension of

[1] "Early History of Mankind," pp. 67–74.

instinct, whereas it manifests itself not only as a new combination of powers, but also as one that is constantly setting instinct aside and reducing it to its lowest terms.

This theory of an exact correspondence between cerebral states and rational activity makes no sufficient and no plausible provision for the growth of rational powers. Cerebral states and cerebral actions are not inexhaustible. If a distinct combination is demanded by each distinct thought, and if memory requires the preservation of these combinations, the capacity of the brain would be steadily exhausted by its development, and we should experience in reason, as we do experience in instinct, limits to mental unfolding. So small a substance as the brain cannot, in its molecular states, be the counterpart of the entire universe in all the actual and possible relations of its parts. There must be some limit to the discursus of reason if each thought appropriates a definite portion of a limited power. The theory is unreasonably complicated, and in that degree improbable. It would also imply increased difficulty in the acquisition of mental power, when the facts disclose increased ease. Nor is it any relief to this embarrassment to say that the special senses, like the eye, give the mind very complex impressions by an equally complex organic state. The image of a landscape is displaced by each succeeding image. The eye is a specialized organ that has been developed to its present power by stages of growth that date back almost to the beginning of animal life, and yet its maximum power is represented in the reproduction of a single landscape, with very great limitation of distinctness of vision beyond the immediate centre of observation. The method and degree of reproduction in the eye and the ear give no color of plausibility, but the reverse rather, to the supposition that the cerebrum has in its molecular action an exhaustless representative and retentive power both in the regions of imagination and of abstract thought.

Mathematical truth and all exact knowledge lead to the opposite conclusion. Cerebral states as physical effects can never be the precise counterparts of each other in different brains. No truth, therefore, dependent on such states could be absolute and universal. Some kind of color-blindness would sooner or later show itself in all directions.

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The deductive reasons already referred to come in to confirm this conclusion of the relative independence of pure thought in an unmistakable way. No physical relation can be the equivalent of logical convictions; and no convictions can be merely physical effects. The two lines of law are not parallel, and cannot be made the counterparts of each other. The conditions of thought are not those of force.

We may then pass all strictly physical experience as indeed giving limits to liberty and sometimes limits crowding very close upon it, but limits that never abolish it as long as thought remains. We turn now to our intellectual experience in its relation to freedom.

Men start with a balance of powers and a bias of disposition which are not easily modified or resisted. This natural disposition is the result of primitive passions and tastes that are stubborn facts by no means to be wiped out by a simple choice, nor indeed altogether to be rooted out by the most faithful and continuous effort. A portion of these proclivities may be attributed to physical inheritance, and a portion to original endowment. For our present purpose we need not strive to settle the balance between them, or even stop to enforce the existence of the second constituent. The position of the individual in reference to liberty is not much altered whether his first make-up comes to him by descent or by gift, or by a combination of the two. The stubbornness of these first tendencies experience clearly records. Those who have the training of children attach great importance to parentage and antecedents. Even in the earliest instruction these forces make themselves felt. The parent and the teacher are constantly aware in the same household of diversities of temperaments and tastes as fundamental considerations in discipline. It is true that much more can be done in shaping these forces early in life than later in life, but they can at no time be overlooked, and will often undo unskilful and even skilful labor in a sudden, resentful way.

It is also to be remembered that the moral inheritance of early surroundings and discipline so adds itself to, and incorporates itself with, primitive endowments as to be practically inseparable from them. By the time a young man begins to come within the range of his own personal freedom a composite

stream of strong currents has him in hand. He need not lose time to inquire how he came by his inclinations, whether by native endowment, by physical inheritance, or by direct instruction; to guide and shape these energies, already realized in volume and direction, becomes his sufficient labor. The limitations of liberty are, therefore, very obvious and very great. They are allied to those of a gunner whose position and piece are given him. Said an active boy in answer to the complaints of his sluggish companion, "I do not walk so fast on purpose, I cannot help it."

If we look at the limitations of liberty in reference to the immediate actions that are to follow them, we may regard freedom as not having much to do with the ordering of life. Indeed, hasty reasoners often come to this conclusion.

A restriction closely concurrent with this of primitive disposition is that of habit. We all become increasingly aware of this restraint as we advance. We are not simply hampered by physical habits, but by intellectual ones also. The lines of thought we have taken up we pursue with increasing ease, but we are at the same time more and more reluctant to accept new ones. In youth we were adepts in mathematics or quick in languages; in middle life we discover we have much narrowed these powers by disuse. We have passed the point of indifference in reference to any class of attainments, and find them all positively easy or positively hard.

The convictions we have reached, especially those touching action and character, personal, social, and religious, though they themselves may have grown up in the exercise of liberty, are still limitations upon it. Especially is this true if a dogmatic spirit enters into them and we regard our opinions as finalities.

What Langfrey says of Napoleon is capable of a much wider application. He is speaking of wilfulness—which is really the want of well-ordered will—as united with very great intellectual powers. "The studied frenzy of a calculating mind is without remedy, because it does not depend on a sentiment, but on the very form of the intellect itself." This is true of all mental activity in proportion as it becomes deep and narrow. The life flows on in it as a river in a cañon, not merely beyond flexion, but for the most part beyond observation. A dogmatic in-

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tellect does not simply open before us one way, it systematically closes up all other ways. Dogmatism is a universal loss of liberty, and most of all in the inner life of the mind.

The remoteness of primary principles from the truths which flow from them leads to the same result. Most of the discussion by which the current of empirical philosophy is resisted in our day goes for little or nothing. It lies far out among marginal truths, and can find no acceptance with minds adversely disposed, and rarely leads to a fundamental renovation of thought. A boy sits upon the bank of a stream and gives his slight boat an impulse up the current; it soon returns to him, because the water flows in the opposite direction. The tidal movement of many minds is something not often comprehended, difficult to be resisted, and hard to be overcome. While the questions involved are questions of reason, the questions are very many, and the reasons very many, and are arrayed like armies. Single men, or single regiments of men, can no longer wage successful war.

Another restraint which overtakes freedom in its unfolding is that which arises from the accumulating force of feelings and of social relations. It is thought that the minds of women are less open to the force of reason than those of men. So far as the assertion is true, it is largely due to the emotional energy which characterizes them. This medium of thought refracts and colors the light on all personal topics, till a presentation is insensibly reached that suits the temper of the inquirer. Light is full of all colors, and will yield them all according to our analyzing prism. Wise men find that in dealing with the foibles of others they must not expect to remove them, but rather to accommodate themselves to them. Friends that undertake thoroughly to correct each other will soon reach aversion. Refractions that belong to the very atmosphere of the mind itself must be patiently borne. It is far easier for those who see these disturbances of vision in others to endure them than for those who suffer under them without recognition to remove them.

Not only are the feelings themselves very persistent forces, all our social relations become objective provocations to them, renewing them constantly and with great energy. As we interpret society to-day we interpret it to-morrow; and it acts on us

vigorously to perpetuate ruling impressions. Hence it is not our own emotional atmosphere simply, but the atmosphere of the world we live in, that is unbraiding the light for us, and casting sombre or brilliant colors on the objects about us. To these physical and intellectual restrictions are to be added secondary ones which arise from their interaction. Disease, fatigue, old age, success, failure, predispose the mind to certain judgments which are not easily cast off. The unsuccessful man becomes untrustworthy in his opinions.

We care not to trace these limitations further, but wish rather to inquire how they leave the problem of liberty.

So profoundly are some minds impressed with these subtile and overwhelming influences that human liberty sinks out of all high estimate.

Life seems but a painful beating of the waves of the ocean by a swimmer who must ultimately sink. Constraining forces are of the most pervasive and insinuating order; they are often nearest us when we think least of them, and bind us most when we seem to ourselves most free.

Accumulative impressions, like those now brought forward, require corresponding care in the search for compensatory considerations or they quite confound the thoughts. We are too much accustomed to think of liberty as the immediate casting off of restraint, and as efficient, therefore, in the degree in which this is accomplished. This is far from the truth. The value of liberty lies in its power to work under and with invariable and permanent forces. If liberty involved mobility simply, it would lose its possessions as fast as it gained them. The air is mobile, and for that reason its distribution of parts has little interest. We can carve nothing out of it and record nothing on it. Rocks are comparatively immobile, and immediately they become material in many forms of work, while their distribution is an important fact. If results followed on after vagrant wishes, choice would gain apparent power, but would suffer immense loss. The thing done would be as quickly undone, and the clash of choices would be as idle as the collisions of winds. Indeed, there can be but one Aladdin with his magic lamp. He alone must be left to act on things fixed and permanent for all but himself. A pair of them would subvert the world, become

spirits with invulnerable bodies who could settle nothing in conflict.

The resistance which surrounding conditions offer to liberty represents the strength and tenacity of the material at the service of the mind, and is a question simply of the right degree. If the resistance is slight, the gains are slight; if the resistance is great, the labor must be great, but so also may be the results.

Now the individual and the race encounter in the exercise of freedom two lines of resistance: that offered by matter and that offered by the mind itself. The first of these is, in the strictest sense, the coherence and firmness of material. It is the office of mind, availing itself of inorganic and organic laws, to permeate matter and hold it to fixed and extended service. The most complete illustration of this is the human body, penetrated in every part with nerves of sensation and action, and so becoming not itself merely an arena of mind, but a powerful instrument of mind, operating by means of it freely in the physical world. To complete this mastery of mind over matter, to establish it as a settled intellectual dynasty, is what wise men are about in the world.

Now material laws are sufficiently pliant to thought to make this labor possible, and sufficiently resistful to make the gains of infinite worth when secured. Men soon learn that mere vaporing accomplishes nothing, but they also learn that skill and patience are surprisingly effective.

The stream does not flow like water, but it flows like a glacier. It can hardly be said that the physical material offered the hand of man is so intractable as to waste liberty; it has rather that degree of tractability which stores liberty.

But the second line of resistance is one of equal interest—the restraints which the laws of mind offer to mind. It has been found a universal social law, that if freedom is to grow, wisdom and virtue must grow with it. It is the same truth we are contemplating in the limitations of liberty within the mind itself. The agency slips away from the agent unless the agent masters himself also. While man is held back from the control of the physical world by laws within that world, he is equally held back by laws within himself, and the two sets of laws must be handled together and mastered together; otherwise the

movement will soon find arrest. When the mind stagnates within itself its external force is lost also.

What do the limitations of freedom which we have found arising within the mind itself signify but this, that the growing points of intelligence and virtue must be carefully maintained? If these are lost, freedom is lost. The mind settles down under fixed opinions, becomes subject to an unbroken sequence of feelings, and accepts the social sentiments that prevail about it.

The one condition of freedom is to maintain unimpaired intellectual activity in all directions of action. This alters the horizon, varies the grounds of effort, breaks up and subordinates habit, and holds in arrest the aggression of other minds. The mind that ceases on any topic—for instance, on that of religion—from fresh intellectual activity has turned down the light by which it should be guided, and it is only fortunate, therefore, that it begins to fall into a calculable routine of action, that it does not go plunging on with nothing to direct it. When the buds of a tree cease to shoot the leaves may come and go for a while with the seasons, but the constructive life is arrested. The limitations of liberty do not show the power of man to be nothing, but only that there are moments, places, and ways of its skilful application.

While spontaneity exercised in thought (and in this way productive of light) is the condition of continuous freedom, the condition of the condition is virtue, feelings that turn on and subordinate themselves to the truth. If the intellectual movement is not honest in its incipiency it shortly fails of thoroughness. It is not light alone that is the efficient constructive force in the green tissue of leaves; it is light and heat. It is not truth alone that maintains the vitality of growing points in the mind, but truth and feeling.

Feelings that are alien to the facts soon alter our conception of the facts, and so the facts shake us off and escape us. We are not masters, because we have lost the true word of command.

Personal liberty is like liberty in the state. Its safe possession is one of profound obedience to deeply implanted principles. It is not, therefore, the less liberty or of less worth. On

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the one side the very condition of strength is a struggle with domineering tendencies, and on the other their steadfast government under new conditions. Liberty is a movement from law to law, each succeeding law being higher, broader, more inclusive, and more fortunate.

The value of liberty is that it enables the mind freely to conform to law. The liberty that does not pass instantly into law is like the seed that is not sown in the soil. It abides alone. Liberty that confines itself to its narrow field, that is content to knit skilfully together the past and the future at the one plastic point, the present, is not weak, it is well-nigh omnipotent. It only requires long times and large spaces in which to unroll its power; it merely calls for material of every order and the union of every law by which to record its work. There is no reason in any limitation of liberty why, under the laws of inheritance, man should not in time walk the earth with the bounding life of an archangel, govern it with the strength of an archangel, and take home its thoughts and feelings to the pure and serene experience of an archangel.

The one law of this progress is continuous intelligence and virtue.

HISTORICAL.

THE Victoria Institute is an organization which has for its object the creation and distribution of literature illustrating the relations between science and religion. Many of its members are in Canada and the United States, and many of its ablest papers are produced on this side the Atlantic. It was very natural that in the course of time it should occur to American Christians and scholars that it would be well to attempt the formation of a similar institution in this country.

Whether there would be found enough interest to give this movement such a beginning as would attract the attention of those who should be interested in such an undertaking, and who could give it the aid necessary to make it practically useful, could not be determined until some one risked a commencement. The Rev. Dr. Deems, the pastor of the Church of the Strangers in New York, who had for years been a member of the British Institute, and the Rev. Amory H. Bradford, pastor of the Congregational Church in Montclair, made an effort to ascertain whether there could be found ten gentlemen who would deliver a course of lectures all in the line of the relations of science to religion. They had the pleasure of discovering not only that the scheme was practicable, but that many gentlemen distinguished for their learning, and held in high repute throughout the country on account of their exalted character, were in sympathy with the movement, although they could not take part in the first course. A syllabus having been made, a hearty coadjutor was found in William O. McDowell, Esq., who owned a beautiful property called Warwick Woodlands, situated on the west side of Greenwood Lake, a beautiful body of water lying nearly equally in New Jersey and New York, at the terminus of a rail-

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way forty-two miles in length from New York City. This gentleman engaged to build a Hall which should be used for the Lectures, and by his energy secured an Encampment Hotel, the rooms of which consisted of tents. He showed the additional munificence of paying the fees and expenses of the lecturers. According to announcement the course was opened on the morning of July 12, with the reading of a portion of the Holy Scriptures and with prayer by Charles F. Deems, D.D., LL.D., who had permitted himself to be announced as Dean of the School, and who presided over all its exercises. Dr. Deems then delivered a lecture on *The Cry of "Conflict."* On Wednesday, 13th July, the opening worship was conducted by Rev. W. B. Palmore, of Mo., and a lecture delivered by President Porter of Yale College: the subject, *What we mean by Christian Philosophy.* On Thursday, 14th July, the opening worship was conducted by Rev. George A. Gates, of Montclair, and a lecture delivered by Prof. Borden P. Bowne, of Boston University: the subject, *Some Difficulties of Modern Materialism.* On Friday, 15th July, the opening worship was led by Rev. Prof. Sawyer. The Rev. Thomas Guard, of Baltimore, had been announced, but the state of the health of that gentleman kept him from the School, and his place was supplied by Prof. Stephen Alexander, of Princeton, whose lecture was on the *Origin and Primitive State of Man.* On Saturday, 16th July, the public worship was conducted by Rev. Addison K. Strong, D.D., of Hoboken, and the lecture delivered by Prof. C. A. Young, of Princeton, on *Astronomical Facts for Philosophical Thinkers.* A number of persons remained in the Encampment Hotel, and many visitors were at the other hotels around the lake, drawn thither by the great beauty of Lake Greenwood and its vicinity. The published syllabus provided a sermon for Sunday, and no discourse collected a larger congregation than that which attended the sermon, which was delivered by the Rev. Amory H. Bradford, A.M., of Montclair, N. J., who had acted as Secretary of the Summer School from its inception. Mr. Bradford's subject was *Conditions of Spiritual Sight.* The text was Matt. v. 8: "Blessed are the pure in heart, for they shall see God." Monday, 18th July, the public worship was conducted by Rev. W. C. Stiles, of Brooklyn, and the lec-

ture delivered by Prof. Alexander Winchell, of the University of Michigan: the subject, *The Philosophical Consequences of Evolution.* Tuesday, 19th July, the public worship was conducted by Rev. Dr. Taylor, of Newark, N. J., and the lecture delivered by the Rev. Lyman Abbott, D.D., of New York City: the subject, *Foundations of Christian Belief.* Wednesday, 20th July, the public worship was conducted by Rev. Dr. E. O. Flagg, of Newark, N. J., and the lecture delivered by the Rev. J. H. McIlvaine, D.D., of Newark, N. J.: the subject, *Science and Revelation.* Thursday, 21st July, the public worship was conducted by the Rev. Dr. Bacon, of Toledo, O., and the lecture delivered by Prof. B. N. Martin, of the University of New York: the subject, *Recent Physical Theories, in their Bearing on Teleology.* Friday, 22d July, the public worship was conducted by the Rev. Dr. Craven, of Newark, N. J., and the lecture delivered by President John Bascom, of the University of Wisconsin: the subject, *The Gains and Losses of Faith from Science.*

From the beginning to the close of the course of lectures there was an increase of attendance and interest.

On the 21st of July, 1881, in the Hall of Philosophy at Warwick Woodlands, Greenwood Lake, N. Y., a meeting was held on call for the purpose of organizing the American Institute of Christian Philosophy. The Rev. J. H. McIlvaine, D.D., of Newark, N. J., presided, and Rev. A. H. Bradford, of Montclair, N. J., was elected Secretary. The following paper was adopted and published as the prospectus of the American Institute of Christian Philosophy.

OBJECTS.

This Society has been founded for the purpose of promoting the following Objects of high importance to both Religion and Science:

First. To investigate fully and impartially the most important questions of Philosophy and Science, but more especially those that bear upon the great truths revealed in Holy Scripture, with the view of demonstrating the harmony between true Christianity and true Science.

Second. To associate MEN OF SCIENCE and AUTHORS who have already been engaged in such investigations, and all others who may be interested in them, in order to strengthen their efforts by association, and by bringing together the results of such labors, after full discussion, in the printed

Transactions of an Institution; to give greater force and influence to proofs and arguments which might be little known, or even disregarded, if put forward merely by individuals.

Third. To consider the mutual bearings of the various scientific conclusions arrived at in the several distinct branches into which science is now divided, in order to get rid of contradictions and conflicting hypotheses, and thus promote the real advancement of true Science; and to examine and discuss all supposed scientific results with reference to final causes, and the more comprehensive and fundamental principles of Philosophy proper, based upon faith in the existence of one Eternal God, the Creator of all things.

Fourth. To publish Papers read before the Society in furtherance of the above objects, along with full reports of the discussions thereon, in the form of a Journal, or as the Transactions of the Institute, or in a Quarterly Review of Christian Science.

Fifth. When subjects have been fully discussed, to make the results known by means of Lectures of a more popular kind, and to publish such Lectures.

Sixth. To publish English translations of important foreign works of real scientific and philosophical value, especially those bearing upon the relation between the Scriptures and Science; and to co-operate with other philosophical societies at home and abroad, which are now or may hereafter be formed, in the interest of Scriptural truth and of real Science, and generally in furtherance of the objects of this Society.

Seventh. To found a Library and Reading Room for the use of the Members of the Institute, combining the principal advantages of a Literary Club.

MEMBERSHIP AND SUBSCRIPTION.

The Annual Subscription for MEMBERS is Ten Dollars. The Annual Subscription for Associates is Five Dollars. One Hundred Dollars will constitute a Life Member, and Fifty Dollars a Life Associate.

Members are entitled to a free copy, by mail, of each number of the Official Publication which contains the papers read before the Institute; also to a free ticket to every course of Lectures delivered under the auspices of the Institute; also to a free use of the Institute's Library.

Rev. Charles F. Deems, D.D., LL.D., was elected Provisional President; Rev. Amory H. Bradford, Provisional Secretary; William O. McDowell, Provisional Treasurer; and those gentlemen were empowered to do all that may be necessary, in their judgment, to promote the objects of the Institute until the Institute should be incorporated and by-laws should be adopted.

The first monthly meeting was held at Warwick Woodlands,

on the 28th of August. It was then ordered that all sums coming to the Institute by legacy or gift be invested by the officers as a permanent endowment fund, unless otherwise directed by the devisers or donors. The following gentlemen were elected Vice-Presidents, viz.: John Bascom, LL.D., of Wisconsin; Hon. Kemp P. Battle, LL.D., of North Carolina; Rev. Bishop Charles Edward Cheney, of Illinois; and Gen. G. W. Custis Lee, of Virginia. It was ordered that the annual membership run for one year following the first of the month next after the date of the payment of the fee. The officers of the Church of the Strangers having offered to the Institute the free use of their parlors for the office and the meetings of the Institute, the generous offer was accepted, and it was ordered that the monthly meeting of the Institute shall be held in those parlors (4 Winthrop Place, Greene Street, near Waverley Place, New York) on the last Thursday of every month, at 7.30 P.M., unless otherwise ordered.

The second monthly meeting was held on the 29th of September, 1881, in the rooms of the Institute, 4 Winthrop Place, New York, the Rev. Dr. Deems presiding. Rev. Edward M. Deems, pastor of the Westminster Church, N. Y., conducted the religious services. A form of certificate of membership was adopted, and a committee was appointed to report to the next monthly meeting a system of by-laws.

The third monthly meeting, being the first quarterly meeting, was held in the rooms of the Institute, the President presiding. A portion of the Holy Scripture was read and prayer was offered by Marshall B. Smith, D.D., of Passaic, N. J. The Committee on By-Laws reported the following paper, which was unanimously adopted:

By-Laws of the American Institute of Christian Philosophy.

ARTICLE I.

NAME.

This Society shall be known as The American Institute of Christian Philosophy, and its Constitution shall be the act of incorporation, together with the prospectus setting forth objects, etc., adopted July 21, 1881.

ARTICLE II.

MEETINGS.

SEC. 1. The Institute shall hold regular monthly meetings on the last Thursday evening of every month, at 7.30 o'clock, except when otherwise ordered.

SEC. 2. The President shall preside at all the meetings, or in his absence, or at his call, some Vice-President; and in the absence of President and Vice-Presidents, the members of the Institute shall select from among themselves a President *pro tempore*.

SEC. 3. The following shall be the order of proceeding at the monthly meeting:

1. Reading Holy Scripture and Prayer.
2. Reading the Minutes of the latest preceding Meeting.
3. Election of Members.
4. Election of Officers, if any vacancies exist.
5. Report of the Standing Committees.
6. Report of the Special Committees.
7. New Business.
8. Announcements.
9. Reading of the Paper appointed for the Evening.

SEC. 4. Upon the arrival of the hour appointed for any paper which has been announced, its reading shall take place, and the unfinished items of business shall follow the reading.

ARTICLE III.

OFFICERS.

SEC. 1. The Officers shall be a President, a Vice-President for every State in which there are members, a Secretary, and a Treasurer.

SEC. 2. The Officers shall be elected by the members from among the members.

SEC. 3. The election of Officers shall be by ballot, and shall take place annually at a time to be hereafter fixed by the Institute.

SEC. 4. Gentlemen not residents of the United States may be chosen Honorary Vice-Presidents by the Institute.

ARTICLE IV.

DUTIES OF OFFICERS.

The duties of the Officers shall be such as ordinarily pertain to the offices of President, Vice-President, Secretary, and Treasurer. The Treasurer shall render a statement at each monthly meeting of the sum of the

amounts received and the sum of the amounts expended. He shall also present a written report quarterly at the meetings held in March, June, September, and December of each year, giving the items of expenditure. The reports of the Treasurer shall be audited by the Committee on Finance.

ARTICLE V.

STANDING COMMITTEES.

SEC. 1. There shall be five Standing Committees, viz.: on Membership, on Finance, on Papers, on Lecturers, and on Publication.

Each Committee shall consist of five members, to be appointed by the President from among the members and associate members.

SEC. 2. *Committee on Membership.*—It shall be the duty of this Committee to secure members for the Institute, and to examine and report upon any questions which may arise touching membership.

SEC. 3. *Finance Committee.*—The duty of the Committee on Finance shall be to devise ways and means to carry out the objects of the Institute, and to make the permanent investments ordered by the Institute.

SEC. 4. *Committee on Papers.*—It shall be the duty of the Committee on Papers to secure articles to be read at the monthly meetings of the Institute, and to determine upon the fitness of such as shall be voluntarily offered, and to pass to the Committee on Publication all papers that have been read before the Institute.

SEC. 5. *Committee on Lecturers.*—It shall be the duty of this Committee to procure gentlemen to deliver lectures at the quarterly meetings and in any courses that may be determined upon by the Institute.

SEC. 6. *Committee on Publication.*—It shall be the duty of this Committee to examine the papers and lectures and report to the Institute such as they think should be published, and to supervise the publication of papers ordered by the Institute.

ARTICLE VI.

CHANGES IN THE BY-LAWS.

Any one of these By-Laws may be rescinded or amended by a vote of two thirds of the members of the Institute assembled under notice to act upon the proposed change.

A paper was then read by Edward C. Mann, M.D., of New York, on *Errors of Materialistic Physiology*. It was discussed by Rev. Wesley R. Davis, Marshall B. Smith, D.D., Gen. O. O. Howard, Rev. A. H. Bradford, and the President, and was ordered to the Committee on Publication.

The following gentlemen, who had become members of the

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Institute, were elected Vice-Presidents, namely: James McCosh, D.D., LL.D., for New Jersey, and the Rev. Bishop McTyeire, for Tennessee.

It was determined to issue a quarterly publication to be the organ of the Institute; and Rev. Dr. Deems, Gen. O. O. Howard, and Charles M. Davis, Esq., were appointed to bring out the first number, in which it was directed that the publication of the lectures before the Summer School of Philosophy be begun.

The fourth monthly meeting was held in the rooms of the Institute, December 1, 1881; Rev. Dr. Deems presiding. A lesson was read from the Holy Scripture and prayer was offered by George Washburne, D.D., President of Robert College, Constantinople. President Porter, of Yale College, and Bishop Hurst, of Des Moines, Iowa, were elected Vice-Presidents. A paper on "English Philosophy," prepared by Rev. J. W. Mendenhall, Ph.D., of Ohio, was read by Rev. George E. Strobridge, of New York. It was discussed by gentlemen present and ordered to the Committee on Publication. Mr. William O. McDowell presented the Act incorporating the Institute with the following trustees, viz.: Charles F. Deems, Howard Crosby, A. H. Bradford, Cornelius Vanderbilt and William O. McDowell.

The fifth monthly meeting was held in the rooms of the Institute, Dec. 29, 1881, Rev. Dr. Deems presiding. A lesson was read from Holy Scriptures, and prayer offered by Rev. W. H. Barnes, Rector of the Church of the Atonement, Brooklyn, N. Y. The great inclemency of the weather having detained many, the reading of the paper prepared for the occasion was postponed.

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NOTES.

ONE Monsieur Lepaux, at the time of the French revolution, invented a religion called "Theophilanthropy." It was a sort of sentimental Rousseauism. He wished to impose it upon France, but finding that in spite of his arguments and endeavors he made but little progress, he is said to have sought the advice of Talleyrand. "I am not surprised," said Talleyrand, "at the difficulty you experience. It is no easy matter to introduce a new religion. But I will tell you what I recommend you to do. *I recommend you to be crucified and to rise the third day.*"

ONE of the Red Republicans of 1793 was telling a good peasant of La Vendée: "We are going to pull down your churches and your steeples—all that recalls the superstitions of past ages, and all that brings to your mind the idea of God." "Citizen," replied the good Vendéan, "pull down the stars then."

THE latest word from the most advanced teachers of modern science: After the long battle between Moses and Geology—a battle specially distinguished by timid concessions of friends of Moses—it has at last come to this, that the President of the British Association and the Vice-President of the American Academy of Natural Sciences have admitted as the prevailing feeling of geologists, that the "whole foundation of theoretic geology must be reconstructed."

IT is said that once, in a company of literary gentlemen, Mr. Webster was asked if he could comprehend how Jesus Christ could be both God and man. "No, sir," he replied, and added: "I should be ashamed to acknowledge him as my Saviour if I could comprehend him; he would be no greater than myself.

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Such is my sense of sin and consciousness of my inability to save myself, that I feel I need a superhuman Saviour—one so great and glorious that I cannot comprehend him."

AT twenty years of age Prince Metternich, the great diplomatist, was "an atheist, as he confesses, after the fashion of D'Alembert and Lalande." At forty, when he had. passed the "vealy" age, he wrote to a friend: "I read every day one or two chapters of the Bible. I daily discover new beauties in it, and I prostrate myself before this admirable book. Now I believe and do not criticize."

DR. GRAY, of the *Interior*, while crossing the ocean heard on the steamer a lecture from Professor Murray, who was on the Challenger, the vessel sent forth to make the deep-sea soundings. He gave the following account of the "*Bathybius* delusion:" "Professor Huxley twelve or more years ago announced the discovery of the original protoplasm, the substratum and source of all life which, he claimed, covered the whole bed of the oceans. This discovery had long been the desideratum of biology, and it was hailed with enthusiasm in all scientific circles. By casting a dredge in deep water anybody could draw up and see for himself the Adam and Eve of life—the living mud of the ocean beds. The Challenger sailed with this theory as a part of her cargo. In the investigations which led to it the sub-oceanic ooze or mud was preserved in alcohol and taken home for closer examination, where the protoplasmic matter was plainly seen, and, as it was supposed, demonstrated. But in experimenting with it Professor Murray discovered a mingling of sea-water and alcohol gave a flocculent precipitate, which, when it had separated from the liquid, became the identical nucleated protoplasm announced by Professor Huxley—became the paternal Bathybius itself! On his return home he showed the experiment to Professor Huxley, and thus this celebrated scientific delusion vanished. It was a rude shock to the complaisant materialistic biologists, who had built extended theoretical edifices, written learned treatises upon it. The protoplasm was nothing but a precipitated sulphate which any chemist, or even amateur, could make for himself."

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The Christian Philosophy Quarterly.

No. for October, 1881.—1. Historical.—2. The Cry of "Conflict:" by President Deems, of the Institute.—3. What we mean by Christian Philosophy: by President Porter, of Yale College.—4. Some Difficulties in Modern Materialism: by Professor Bowne, of Boston University.—5. The Religious Aspects of the American Scientific Association: by Prof. Trowbridge, Glasgow, Mo.

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SPECULATIVE CONSEQUENCES OF EVOLUTION.

Admitting that all natural events take place according to a method of evolution, what inferences emerge in the field of speculative thought? The discussion of the question possesses both theoretical interest and practical importance. Popular apprehensions on this subject are generally vague, undiscriminating, and misleading. Even theological teachers are sometimes heard uttering judgments and pronouncing condemnations which imply very inexact methods of analysis. When authorized teachers of sacred truth denounce a belief which commands the sanction of those in whose domain the subject-matter is located, and one whose evidences awaken ready conviction in most thoughtful minds, we are forced to the conclusion that adequate knowledge and due discrimination are lacking; and we feel that the sacred cause of truth is injured by hands appointed for its defence.

Some of the misapprehensions resulting from an unphilosophic view of the subject of evolution ought to be briefly pointed out by me *in limine*.

First, the particular exposition of the subject offered by some high scientific authority is assumed as a just and adequate delineation of evolution and its implications. The danger of misguidance and error arises here not in the domain of the facts, and only to a limited extent in the inductive use made of them; it arises in the philosophic interpretation and application of facts and generalized principles. An inept philosophizer may leap to deductive inferences as unfounded as detrimental to the interests of theological truth. The implications of evolution are not necessarily what any particular expositor may rashly affirm; still less are they all which a layman may feel inclined to infer from the silence or reserve of any teacher of science. We may justly look to scientific authority for the establishment of facts of observation and their orders of sequence. In the further interpretation of these results we must not suffer our belief to be controlled by the idiosyncrasies of individuals however learned in science, nor by hasty inferences from the silence of such individuals; nor by the prepossessions and prejudices of persons who are constitutionally incapable of assuming a judicial atti-

tude; nor, least of all, by the denunciations of those who are both ignorant and impassioned.

Secondly, a very wide-spread practice of misrepresentation of some of the great authorities has been indulged. They are accused of many unavowed beliefs and disbeliefs simply because the disavowal of them has not held a prominent place in their writings. When we come to a close and candid scrutiny of things actually said, we find no real ground for most of the calumnies in circulation. The charges to which I refer are simply the *inferences* of accusers, drawn illogically from the scientific positions held by certain men of science.

Thirdly, it is extensively maintained that a method of evolution in the world constrains us to a mechanical and necessitarian view of natural events, and tends to exclude spiritual and divine agency. All this I claim to be widely erroneous and sadly pernicious; and I shall soon proceed to set forth reasons for the opinion.

The persons who launch these condemnations against evolution and its implications are those who believe it to be the teaching of "science falsely so called." They profess to love all truth, but dare to usurp the authority of trained judges in determining what *is* truth. Their mode of adjusting science to their creeds is the counterpart of that erudition which quotes garbled phrases of sacred Scripture to sanction every iniquity. Each takes simply what fits his purpose, and rejects the remainder. But what if the method of nature shall finally be found a method of evolution? What will be the predicament of those who have staked all religious truth on an allegation of the untruth of evolution? These are questions for the wise to ponder. But at this moment the well-nigh unanimous verdict of the scientific world sustains the doctrine of evolution. This verdict is one of the criteria of truth. Repudiation of it is a risk which only rashness and ignorance will incur. To stake all religious belief on such repudiation is to throw all of man's spiritual interests upon the hazard of a die.

It is my present object to show that the recognition of a method of evolution in nature's operations does not involve consequences deleterious to a spiritual faith, but is a means, on

the contrary, for approaching into closer relations with the immaterial forces of the divine government of the world.

We must first establish a clear conception of the meaning of evolution. Multitudes of men imagine evolution and Darwinism to be synonymous terms, if they do not even believe them synonymous with materialism, as is so often charged. I shall not shape a definition to suit my ends; but shall formulate my apprehension of that great truth in nature to which my ends have been shaped. I conceive the evolution which I discover in nature to be *the progressive differentiation of an identical existence*. It proceeds from the more general to the more special —from the homogeneous to the heterogeneous. It involves and exemplifies the Leibnitzian *principle of continuity*. It means that new forms of existence are only older existences transformed, and not new beginnings of existence. All the aspects of the natural world are derived. Every department of the cosmos has had a history, and every present is the outcome of a past. It takes no cognizance of special originations, but only of the history which follows.

Evolution, I say, knows nothing of creation. This is not because it contravenes creation, but simply because creation is an event which does not come within its purview. Evolution is the name of a mode of continuance, not of a mode of beginning. As it concerns only the mode of continuance, it can neither affirm nor deny any mode of origin. It traces the genealogy of events as far back as possible, and may leave us to presume with reason that the remotest discovered term in any case is itself really derivative. But the doctrine can never justify the absolute assertion that a given term is not primordial. If we have other grounds for predicating absolute commencements of existence, evolution can dispute the proposition only so far as it can demonstrate derivative relations. When this cannot be done, we can only judge the allegation on the basis of analogy or of pure reason. On the basis of analogy we may discover a strong presumption of the derivative origin of a term which to observation is ultimate. On the basis of pure reason we have the right to affirm that every succession of

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events must proceed from some beginning; and that even if a genetic relation runs through the universe of existence, there was at least one primordial term which originated by creation.

The method of evolution is well exemplified in the developing embryo of the domestic fowl, or other animal. The essential structures in the beginning are simply the germinative dot, the germinative vesicle, and the yolk. The latter undergoes a process of segmentation. The cells arrange themselves in the form of a sac with a single wall; then with a double wall. Traces of the vertebral axis appear; vertebræ, heart, arteries, and other organs are at first faintly and crudely outlined, and gradually approach their perfect condition by a process of wider and more numerous differentiations; while other details of structure continue to rise into existence until the creature is complete. Here is continuity of existence diversified and evolved through progressive differentiations.

So a continent first emerges from the sea as a rude, central nucleus. In the progress of geologic ages, it rises higher, widens successively its borders, assumes a diversified surface, and therefore diversified climates, floras, and faunas. Meantime its widening bounds have extended over every inch of its surface. Its most extreme conditions have been reached by unbroken transition through all intermediate conditions. Its total history is wrought out through a material continuity. So, as geology teaches us, the entire planet has assumed its present phase through absolute continuity of existence between the present and older phases; and comparative geology traces continuity of existence backward from the planetary to the stellar and even the nebular phase of cosmical life.

The proofs of the universality of a method of evolution in nature it is not my purpose to present. We assume the fact of evolution, and inquire what follows. It may be stated in passing, however, that, as I have contemplated the phenomena of the world which reveal an evolutionary course of events, they may be grouped in five classes of evidence: 1. The cosmical evidence—which concerns inorganic existence; 2. The morphological evidence; 3. The palæontological evidence; 4. The variational evidence; 5. The embryological evidence. The cosmos, if we interpret it correctly, proclaims an absolute con-

tinuity of world-life through every phase of cosmical existence. If we turn to organic existence, morphological affinities carry the indications of genetic relationship beyond the narrow limits in which observation demonstrates it, and find kinship running through all the ranks of the organic series. Palæontology traces lines of kinship backward through time to beginnings as humble as the lowest grades of living animals and plants. Variability shows that it falls within the plan of nature to admit specific divergences as wide as those which separate consecutive representatives of an organic type in palæontological history, and thus renders possible a genetic relation in the grades of extinct beings. Embryology offers a succession of phases in the development of an individual, which faithfully reproduces the succession expressed in the history of extinct animals, and again in the taxonomic arrangement of living animals.

Morphology exemplifies the nature and phenomena of genetic relationship. Palæontology suggests as a probability a genetic relationship between forms which have passed away and forms which still live. Variability points out a tendency to divergence and a method of derivation; while embryology epitomizes in the individual, and as a real continuity, the succession enacted in the history of the animal kingdom, and constrains us to admit a real continuity in the larger history as well as in the epitome.

Now, if we find the facts of the natural world such as to convince us that nature brings out complex results through a method of evolution, the speculative consequences, or logical inferences from the principle, may be ranged along three lines of thought: 1. Phylogenetic, or scientific; 2. Ætiological, or inferences concerning causation; 3. Theological, or conclusions touching the relation of God to the world.

I. PHYLOGENETIC CONSEQUENCES.—If all present forms and phases of material existence have arisen through continuity with the past, every present form must constitute the momentary termination of a line of derivation which it may be conceived possible to trace backward toward its source. The doctrine of derivative origins expresses the grandest possible conception of the unity of nature. In the realm of world-life it substitutes for an array of objects having distinct and merely

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casual origins, without reference to a universal plan of cosmic existence, a grand scheme of consecutive growths, where each aspect pictures a definite phase in the common career of mundane ontogenies. Like the trees of a forest, the worlds of the firmament present to our contemplation worlds in the formative or nebular stage; worlds in the intense development of solar life in all its progressive phases; worlds waning into planetary dimness; worlds in all the advanced and productive preparations for the sustentation of organic beings; worlds in the stage of planetary senescence; worlds fossilized, tenantless, silent, awaiting some final crisis which shall remand them to a resurrection and a new life. Knit together in a web of relationships, the vast realm of starry existence proclaims one beginning and one end; one common career of change; one system of forces, one system of agencies, one empire, one controlling intelligence.

Turning from the inorganic to the organic realm, our contemplations are restricted to the surface of a single world—except so far as analogies of cosmic conditions may authorize us to predicate analogies in the correlated modes of existence upon other worlds. Dismissing such possibilities and probabilities, the disclosure of a method of evolution by material continuity presents us in the endless diversifications of life upon our planet, as spread before us in the simultaneous panorama of the present and in the moving panorama of the geological past, a network of relationships and affinities which constitutes a unity scarcely less amazing and suggestive than that revealed in the evolutions of the firmament. On this basis organic types the most divergent come down from a common ancestry. Specific types grouped by systematists in single families have blood-relationship for their ground of organic resemblance. The lines of genetic descent of specific types ought to converge as we trace them into the past. When we uncover the records of that past by geological research, we discover fragments of those genetic lines, and find them everywhere pointing toward remote centres of divergence. In several cases the genetic lines have been reproduced with marvellous continuity and completeness. Palæontological successions, in many cases, have been traced so uninterruptedly backward through the æons of geology, that we may truthfully say the archaic pedigree of several of the

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best known animal types has been pretty completely written down in the pages of science.

The phylogenetic consequences of evolution may therefore be concisely summed up in the following propositions:

1. *The past history and present affiliations of organic types may be represented by a genealogical tree.* We may construct first a general tree of the animal kingdom. There are two great lights to guide us in the attempt. 1st. The recognized affiliations existing among living animals; 2d. The scattered links of palæontological history. To these guides may be added the hints afforded by embryology, in which, as I have said, the history of the animal kingdom is epitomized in the history of an individual. All attempts of this kind are obviously recent, and all, for obvious reasons, are merely tentative and preliminary. But, on the basis of evolution, the animal kingdom has had a genealogical history, and the effort to reproduce it upon the pages of science is legitimate and useful.

Similarly, each sub-kingdom of animals has had a history which constitutes a main branch of the great trunk; and each family group is only the assemblage of blossoms borne at the terminations of a branchlet of the great tree. It falls within the province of science to reproduce these genealogical schemes, and thus perfect its classification of organic nature.

2. *The first advents of organic types must have occurred, generally, in periods more remote than the formations in which their remains are at present known.* This results from two independent circumstances: (1) The formation in which an organic type first appears to observation may include other affiliated types which show a degree of divergence pointing back to a common origin in some remoter epoch; or (2) The organic type appears with a degree of abruptness and fulness of development and differentiation which, on the basis of evolution, imply a long previous history and unfolding, of which the records remain unknown. Guided by the principle of evolution, we may proceed to complete the scheme of derivative origins, and thus eliminate those sudden advents which, in the hands of those who assume our palæonotological knowledge complete, have done such good service in obstructing the progress of evolution-philosophy.

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3. The doctrine of derivation implies that *the various species of animals and plants have been dispersed over the earth from one or more centres.* A starting point must have a location. If all animals, not to say organic beings, are descended from one ancestral form, then it is perfectly legitimate to inquire what part of the earth witnessed its advent. That it was aquatic results from the aquatic nature of the lowest known forms of organization. That it was marine must be inferred from the universality of the ocean at the epoch of oldest organic life. Being extremely humble in its organization, it must have been characterized by exuberant reproductiveness; and the movements of the ocean's waters must have rapidly given the type a very wide dispersion. Variative descent from these new starting-points must have followed slightly divergent lines for many ages. The stocks of fundamental types of animal structure may once have been much more numerous than we have actual knowledge of at the present day—all representatives of them having died out without fossilization. What region of the primitive ocean witnessed this advent and this dispersion we have absolutely no means for determining.

But when the first land animal appeared, we are certain it must have found a home in some region which was then land. The present land areas which have survived from the epoch of earliest land animals are comparatively limited in extent. The first land animals did not appear in Central or Southern Europe; nor in Central and Southern Asia; nor in South America; nor, speaking generally, in North America south of the forty-second parallel, or west of the Mississippi River. In the Northern United States and Eastern Canada, in Wales, Scotland, Ireland, Scandinavia, and Eastern Russia, are regions which may have been the home of the first land animals. There are old continental regions which have disappeared, and the circumstance itself creates a probability that they were in existence at the advent of land animals, and were even among the most fully developed land areas at that epoch. The balance of probabilities points to one of these obliterated areas as the first home and centre of dispersion of all land animals.

Unless man is a case of interrupted continuity with the animal kingdom, his remote pedigree as an animal must be traced

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to such centre. That region of the world pointed out by the evidences as the most probable centre of dispersion for land animals is also indicated by many considerations as the primitive centre of dispersion of the human species. It is on the Eastern Hemisphere, somewhere between Asia Minor and Ceylon, and between the plateau of Pamir and Madagascar. More precisely than this I am unable to speak without entering into scientific details which would not suit the occasion and the end which is my principal aim.

4. *Man's genetic continuity with the animal kingdom is a question still under consideration.* It is a question not yet decided with the same unanimity as that which confirms the general doctrine of specific descent. Among existing species man stands apart structurally and psychically, by a wider interval than intervenes in any other case. Among fossil forms the links are wanting which connect living man with the world of extinct life. For these reasons it may be fairly urged, as Wallace and Mivart have urged, that judgment on man's historical relation to the animal kingdom should be held in abeyance. At the same time, man's structural affinities with other mammals are so close that a real genetic continuity seems probable.

5. It follows from derivative doctrine that *all the races of men are of one blood, and are possessed of one mental and moral nature.*

6. *The antiquity of the human species is much greater than the antiquity of the Mediterranean race.* This follows from the superiority of the Mediterranean race over certain other races, and the consequently later date of its advent into existence. The origin of this race is comparatively not remote, but it has produced the materials of history at a rapid and ever-augmenting rate. When we shall have fixed the era of Menes or of Asshur, we must add many thousand years to express the antiquity of Hottentots and Australians.

7. *The origin of life by abiogenesis is neither implied nor denied by the principle of evolution.* I have said that evolution is a mode of continuance, not a mode of origin. The addition of life to matter previously lifeless is abiogenesis, but it is not continuance; it is a new beginning. That which has life is not an evolution of something without life. Life and death are as

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wide apart as affirmation and negation. It is often charged that evolution proposes to trace all organization back, not only to some primordial germ, but, as is flippantly stated, to dead matter. This is a gross misconception. Not only does no evolutionist claim this, but the assumption would be a rational absurdity. That life has been at some time added to dead matter is a dictate of reason; for the chain of percipient being must have a first link. That organic forms may frequently arise from germless and inanimate matter may be a fact; but it can never be an inference from the principle of evolution. Whenever it takes place we behold an act of creation.

II. ÆTIOLOGICAL CONSEQUENCES. — I leave the further development of phylogenetic consequences to the hands of scientific philosophy. The mention of them has served as a stepping-stone to discussions more germane to the present occasion.

I wish now to suggest and emphasize certain discriminations which must be clearly apprehended by every person who desires to arrive at philosophic judgments concerning the implications of evolution. I have already intimated that evolution is a *mode*, a method, a relation in the succession of terms. It raises a question of *fact* which is to be determined by observation. As a question of fact, it belongs to science. I wish my hearers to feel convinced that evolution is only a question of fact, which can no more be determined by argument or by authority than can the reaction between chalk and *aqua fortis*. Evolution is not a question of *causes* or of *consequences*. It leaves the search for causes exactly where it was before investigation disclosed this method in nature. But, as I shall show, it inducts us more nearly into the sacred presence of Ultimate Cause than ever has been done by science, philosophy, or religion, since the days of the man of Uz and the psalmist of Israel. It leaves the search for consequences to us who wish to know how to adjust our conception of the world to the manifested order and method of the world.

Now, in contemplating the emergence of an event into the field of observation, we must make respecting it the following discriminations: (1) There are certain *conditions* under which it

takes place. Some conditions may be *essential;* their presence is permissive, their absence is inhibitive. Other conditions may be only *modifying.* The presence of material possessing susceptibility of the observed change is always a condition *sine qua non.* In the organic world certain physical concomitants of temperature, moisture, light, and atmospheric air constitute conditions *sine qua non;* while a diminution or excess in the quantity of these agents constitutes a modifying condition.

(2) There may be certain *instrumentalities* or intermedia employed for effectuating the phenomenon under the conditions. I write a sentence; the pen is my instrument, the ink and paper are conditions. I inhale chloroform and become unconscious; my unconscious state arises only on the condition of inhalation, and on the condition that blood in my lungs finds its way to the brain. The heart is an instrument for creating one of the conditions; it is therefore an instrument in the production of the result. The movement of the blood is in a circuit in which the special action of valves and capillaries is involved; valves and capillaries are therefore other instruments. The chloroform enters the blood by exosmose through thin membranous tissues; these, therefore, are other instruments. All the physiological actions concerned in the result sustain an instrumental relation.

(3) There is a source of efficiency which constitutes the *essential cause* of the phenomenon. It employs the instrumentalities, under the conditions, to effectuate the result. Through looseness of thinking conditions and instruments are often denominated causes. I see an ink-mark on a book, and some one says it was caused by a pen. So unconsciousness is said to be caused by chloroform; but chloroform is only the condition of the altered action of that efficiency which employs the vital organs in maintaining the normal state of the body. When I write, my volition is the origin of all efficiency involved; paper and ink are conditions, and the pen and hand, with all its muscles, are instruments, and so are the brain, and the nerves, and the circulatory system which supplies the wastage resulting from thought and effort. Efficiency is transmitted through the instrument, but this does not make the instrument the efficient cause. Back of one instrument may be discovered another, or

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an indefinite number of instruments or mere media for transmission of efficiency; but the real efficient agent or cause is reached only when we discover the primitive source of the efficiency. Any intermedium is often denominated a physical cause. Every effect arises as the sequence of a certain antecedence. The same sequence always implies the same antecedence. This is the uniform order of succession which some of our scientists denominate causation. Properly speaking, it is a law of nature, destitute of efficiency, incapable of causation, and only the symbol of intelligential causative activity. Law is a *mode* of efficiency.

I said that conditions have been erroneously denominated causes. Whatever may be meant, they certainly are not efficient causes. They are simply uniform concomitants to the action of efficiency or real cause. Two men are exposed to the same temperature; one takes a cold and the other does not. The skin of the first was moist with perspiration; that of the other was dry. Now, some philosophers would say the temperature of the air was the cause of the cold taken, and a moist skin the condition. Some would regard the moistened skin the cause, and the temperature the condition. Both have been necessary to the effect; but both are mere conditions. If we consider more closely the nature of the effect, we perceive that on the concurrence of these two conditions certain physiological actions took place which were abnormal, and were followed by those symptoms which we call a cold. The exhalant pores of the skin spasmodically contracted; the current of peripheral excretions was arrested, and turned from the dermal to the mucous surfaces, and this determination was attended by congestion, turgidity, and inflammation. It seems to me these physiological actions lie much nearer the appropriate seat of cause than those external concomitants, temperature and a moist skin. They are in immediate local relation to the seat of the sanitary effect. But these physiological actions are not efficient cause; I have already pointed out their instrumental relation. What made the exhalant pores close? What made the excretory current turn in another direction? What maintained the excretory current in *any* direction? What arrested the flow of blood through the capillaries of the mucous surfaces? These

movements or changes in the organism are themselves an effect of the action of some true efficiency. If you say they are the sequents of some physical action, then I demand the origin of the physical action. Retreat as far as we will, we shall be compelled to recognize at last a starting-point in the line of sequences. That initial term is the source of the efficiency revealed in the physiological action which, under the concurrent conditions, was attended by the sanitary symptoms of a cold.

To sum up, then, the emergence of a phenomenon into the field of observation elicits a discrimination of the concomitants into three classes, efficient cause, intermedia, and conditions. Efficient cause supplies the power, the intermedia transmit it, the conditions are concomitants to which the action of the power is correlated. Cause is emissive of efficiency; intermedium is transmissive, and condition is permissive.

I am quite aware that some philosophers hold, like J. S. Mill, that "the statement of the cause is incomplete unless in some shape or other we introduce all the conditions."[1] Karslake says, "The cause of a thing is that antecedent, or aggregate of antecedents, which is seen to have an intimate connection with the effect."[2] So a distinguished recent writer assures us: "The word cause . . . should be reserved for the combination of agencies producing the result;"[3] and of "condition" he says it is often vaguely and illegitimately used; "in order to be rid of an agent, or to drive it into a corner, they say it is simply a condition."[4] Aristotle is the father of this complex conception of cause, for he says, "A cause is that without which another thing called the effect cannot be."[5] Now, such a definition of the word cause is intelligible, and, if philosophers agree to it, admissible. But at the same time it is no definition at all; since by confession it comprehends concurrences which are either imperfectly known or wholly elude enumeration, and defy all attempts at definition. Moreover, the discriminations which must be made drive us back on an obsolete, Aristotelian diversification of causes. We

[1] J. S. Mill, "Logic," bk. iv. ch. v.
[2] Karslake, "Aids to the Study of Logic," ii. 43.
[3] James McCosh, *Princeton Review*, May, 1881, p. 371.
[4] Ib. p. 373.
[5] Aristotle, "Metaphysics," lib. v. cap. 2.

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must call one concomitant "material cause," another "formal cause," another "efficient cause," another "final cause;" and, if we were to analyze more exhaustively, we should have "instrumental cause," "exemplary cause," and as many other forms of "cause" as the possible modes of conditioning or transmitting the action of the efficiency which terminates in the effect. This would burden us with a crude and cumbrous nomenclature, and would ignore a real and logical discrimination, which throws efficient cause in one class and all the others together into another class. As a mere matter of nomenclature—supposing the discriminations to be kept clearly and faithfully in mind—we might, with greater convenience and propriety, denominate all conditions *concauses*, because they concur with the efficient cause in the determination of the effect; and all instrumentalities and other intermedia might be denominated *subcauses*, since their relation to effect is secondary and not primary, and intervenes between efficiency and effect.

But such a use of terms is not unobjectionable. Our intuitive idea of causality is the simple idea of efficiency. It is this universal idea in human reason which necessitated the term, and which is expressed by the term. What though in any case of efficient action a system of concomitances must be recognized; they are only concomitancy, not cause. The conception of concomitants simply clings to the idea of cause through association, and inattention to a proper analysis. What though efficiency act only in the presence of one or more concomitants. The concomitants sustain only a restrictive or permissive relation; they are not even determinative; still less are they efficient. The president appoints; the senate only consents. The concomitants by their presence or absence do establish limitations and modes for the activity of efficiency; but efficiency is sole cause, not concause or subcause, and demands the sole use of the term as a right, not a usurpation.

The foregoing critique is preparatory to the deductions which I shall presently offer; but I beg indulgence for a few more prolegomena.

While our intuition of causality presents only efficiency, our concept of *cause in action* is complex, and ought to be clearly analyzed. Efficiency as an abstraction is only a potential

cause; it is efficiency set in action which becomes objectively and cognizably causal. In contemplating effects, it is efficiency in action which engages attention. Now, I wish to inquire, What is the constitution of that conception of causal activity which springs up spontaneously in the presence of any change which falls under our cognizance? I have reflected much upon this subject, and have heretofore elaborated views[1] which at present I shall only take the time to enunciate without exposition.

1. Cause in action implies *real being.* Action is a phenomenon of power; and power is an attribute of being. There must be a being or substance which brings power into causal action.

2. It implies *duality of being*—correlative subjectivity and objectivity—the being acting and other being or possibility of being toward which the action is directed, and in which the effect is revealed. This differentiates otherness from the subject, and contravenes pantheism and all forms of monism.

3. It implies *consciousness in the causal being*—consciousness of self, to rouse it from eternal slumber; consciousness of something objective toward which efficiency may be aimed; consciousness of a possible effect which may be wrought in the objectivity; consciousness of the principle of causality to suggest the possibility of attaining a contemplated effect; consciousness of freedom to act, for without this the causal being would be merely the instrument of the being which constrains, and its causality would be only transmitted, not original. It does not imply that attention must be directed to all these objects of consciousness; but a careful analysis will convince any one that all these attributes of intellect must come into exercise in any act of original causation.

4. Causal action implies *motive.* Efficiency must discern a reason why it should act, or it would sleep forever in potentiality.

5. Causal action implies *desire.* Without a feeling of desire for the end conceived, motive would appeal vainly to efficiency to exert itself. Desire is directed toward an end; there can be

[1] "Reconciliation of Science and Religion," ch. iv., v., and vi.

no original causation without a reason why, and an inclination of the sensibility.

6. Causal action implies *intention* to direct efficiency toward the contemplated effect. Intention should be discriminated from volition. Intention looks to the future; it is a purpose to exert a particular volition. Volition is present and immediate. An intention to act in a particular way implies and encloses all the constitutive factors previously enumerated; it therefore implies intelligence and motive. I desire to emphasize the fact that the intelligence and motive enclosed in intention are involved simply in the production of an effect as such. They do not imply any particular kind of effect, whether good or bad, useful or useless, comprehensible or incomprehensible, achieved by one set of instrumentalities or by another, proceeding from a human cause or a natural cause, from a finite cause or an infinite one. Original causation is unthinkable without the implication of final cause.

7. The consummation of the causal act implies the exertion of *will*. Will is merely the name of force guided by intelligence and prompted by motive. The notion of force arises in consciousness in the presence of a volition. Will furnishes the only explanation of force. Mankind have attributed force to unconscious and involuntary things simply because the will which acts in nature is transmitted through so many intermedia, and is itself something incorporeal and hidden from sense.

8. Active cause is a *personality;* it possesses intellect, sensibility, and will, and these are the momenta of personal being.

These eight implications lie concealed in our conception of an act of original causation—I only say *original* causation to forestall habits of thought which attribute causation to mere unconscious portions of matter. I do not believe any metaphysical manipulation can set these constitutive factors in a light materially different. I cannot admit any real causation which is not original; I cannot admit that any original causation is not volitional; I cannot admit that any volitional causation is unintelligent. This outcome possesses the utmost significance in the present discussion, as we shall see.

Let us now apply these principles to the derivation of organic forms. The historical continuity of animal life implies

that animal types as a rule are in process of change and transformation. Assuming that specific types are not permanent, but only momentary phases in the lifetime of a more fundamental type, we have to inquire, (1) What are the conditions under which a given organic transformation takes place? (2) What are the instrumentalities employed in effecting the transformation? (3) What is the efficient cause of the transformation? These questions embody different conceptions, and must be held steadily apart. Now, it is obvious that all deviations from the ancestral type are the direct result of some divergence in the action of the forces of organic growth. In some directions organic growth is accelerated, in others retarded. Increased size or strength of the animal or of any of its members implies accelerated growth. Diminished size or strength, or partial obsolescence, implies retarded growth—diminished action of the organs which supply the elements of growth. Whatever change of structure arises results from the altered action of the agencies of animal-building. Such alteration, it may be said in passing, must be somewhat operative at all periods of life; for the nutritive and reparative processes continue as long as life continues. But alterations in the processes of animal-building must be much more effective in producing changes of structure if they take place while the animal is in the growing period. They must be most effective during embryonic life, when the very foundations of all the structures are coming into existence.

From our present standpoint these simple statements embody most important biological truth. They show that in the progress of any structural change whatever, only the physiological agencies or animal-building activities are immediately concerned in the organic result. We do not care about *the reasons why* the growing forces exert a modified action—in other words, what are the conditions under which their action is modified. *All causal action is in the organism.* It must be in the organism, for cause is efficient only when present as to time and place. *No external coexistences can, with any propriety, be denominated causes.* I emphasize the statement. The environment may present a system of concomitances under which the growing forces may be accelerated or retarded, either in one organ or in

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many organs; but the environment does not thus become a cause. Diminished moisture may be accompanied by a diminished action of the forces which make cellular tissue, and an increased action of those which form ligneous tissue; but diminished moisture is not the cause of the increased ligneous tissue. Moisture absent or wanting cannot be the cause of an effect here and now. Scant supply of calcareous matter may condition slender and unhealthy bone-building; but whatever is done, be it more or less, is not done by scant supply of lime, but by the bone-making forces. Abundant lime may condition the accelerated action of bone-making forces, and huge skeletons may result; but whatever bone-structure results is made by the organic forces, and not by the lime. The struggle for existence may diminish supplies of food, water, air, or rest, and may thus condition the stinted activity of the growing forces generally or partially. The outcome may be lean, dwarfed, or feeble individuals, which will give parentage to their like, or more probably be crushed out of existence by their physical superiors. The superior individuals will more frequently survive, and perpetuate the stronger and improved condition of the species. It is not the struggle for existence, so often denominated a "true cause," which really *causes* the improvement of the type. It is only the condition of two modes of action of the animal-building forces: (1) A retarded action, which does not suffice to maintain life; (2) An accelerated action, or at least a conserved normal action, which suffices to maintain a condition of vigor, or even of improvement. Natural selection is only the outcome of the action of the internal forces as modified to suit external conditions. Natural selection is a result, not a cause. Least of all is natural selection the cause of race improvement, since it is only race improvement under another name.

A similar conclusion must be reached concerning all external concomitances which may have been cited as causes of the derivation of species.

I said that which is true cause must act in the organism. There is action in the tissues and organs which separates nutritive particles from the food, oxygenizes effete particles, conveys the nutritive fluid to all the structures, builds it into cells and membranes, excretes refuse, and does all the work which I

have denominated animal-building. Some of this action is what we call physical; there are capillarity, exosmose, imbibition, exhalation, solution, filtration, and chemism. These activities go on in immediate contact with the structures built; they are at the very seat of causation. Tissue-building efficiency emanates from them. *But it does not originate in them; they are not the true causes of animal growth.* The physical actions in the organism are only *instrumental.* If there be any physiological activities which are not purely physical, so far as they are so they retire into still closer relation to true cause. The real cause of animal-building is that which institutes and maintains the physiological actions in the organism. These actions are effects; they are not self-sustaining original efficiencies, but we have to search behind them for such efficiency.

Now, a critical examination of the nature of the true cause which employs the physiological activities in modified ways, according to conditions external to their seat of action, so as to produce modified organic results, authorizes us to make concerning it the following predications:

1. *The ultimate cause in all organic growth is immaterial.* The minutest material parts of which we have any knowledge are only parts of the machine—they act only because they are acted on by something which eludes our observation.

(1) Let us take two living germs. They are two cells so nearly alike that the utmost power of the microscope is unable to distinguish them as two structures, and the nicest manipulations of chemistry fail to distinguish them as two substances. We may thus feel a scientific conviction that those two cells are materially identical. When, therefore, we find one of them to develop into a frog and the other into an ox, we need no further proof that these two cells were widely distinct in essence, however alike in substance. We also decide promptly that this mysterious and inscrutable principle of distinction is incomparably more important than the substantial identity. It is something which, in spite of apparent identity, controls the whole development of the two cells along lines widely divergent. In short, that which constitutes the essential character of the cell is a potency *beyond the realm of matter.* A force supramaterial

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pertains to the little material structure, acts in it, and impels it onward in a predetermined career of development.

(2) In further proof of the immaterial ground of the force acting in derivation—that is, in the physiological activities which result in derivation—it is allowable to allege the inert nature of the matter of organization. Such an allegation is justified by two considerations: (*a*) *The exertion of any force is causal action, which,* as I have shown, *implies the conjunction of psychic attributes.* These we are not prepared to ascribe to matter, because our own consciousness and experience show that such attributes pertain to a nature which is supramaterial; and because the change from a psychic to an inert organism—that is, from a living body to a dead one—is not a change in the material, but in something which eludes all the tests of matter. (*b*). *A cause can act only when it is present in time and space.* By an accommodation of language we often say two masses of matter attract each other; but it was the opinion of Sir Isaac Newton, who never used the expression, that no physical influence can be transmitted from one body to another without the intervention of a continuous medium between them. There are few thoughtful physicists in our day who believe that matter exerts force across intervals of empty space. But if matter has a molecular constitution, every portion of it is characterized by intermolecular discontinuity, and these empty spaces between the molecules or atoms have been compared to the interplanetary spaces in respect to relative magnitude. There must be, therefore, something existent and efficient beyond the ultimate limits which even imagination can assign for the presence of matter. This conclusion is even more strongly enforced by the vortical theory of molecules. If matter has *not* a molecular constitution, but is continuous, we are presented with problems at which the most gifted physicists stand appalled, insomuch that the continuity of matter is a hypothesis no longer entertained. If, finally, matter is to be regarded merely as a dynamical phenomenon, the very phrase implies its non-substantial nature, and sends us on the search for the subject or ground of the dynamical attribute which originates the phenomenon. On any view of the ultimate constitution of matter we are thus

driven to the recognition of some immaterial entity as the source of the efficiency revealed in physiological activity.

(3) *The efficiency manifest along the nervous tracts cannot have a material ground.* The prick of a pin at the tip of the finger thrills along the neural highways to the brain with a velocity which makes the change at the two extremities of the nerve practically simultaneous. An item of sad intelligence is announced through the material organs of sight or hearing, and the particular tremor imparted to these organs is followed by a particular state of feeling. Efficiency passes from that which is material into that which is immaterial. A vibration cannot be transformed into a sentiment. How does the material movement pass its efficiency over into the realm of mind? Evidently the force which moves mind as well as matter is only a spiritual force. But further, my saddened state of mind deprives me of my appetite. Here is a retral progress. The cause gets back again into the realm of matter, and is felt in action along the neural tracts to the ramifications of the gastric nerves, and their action becomes responsively abnormal; the stomach becomes unfitted to receive food. What is this force which moves the feelings and agitates at the same time all the nervous matter of my system? I can only reply that it cannot be matter or an attribute of matter.

From every point of view it appears, finally, that the forces active in the organism must be grounded in something deeper than the matter of the organism.

2. *Physiological force acts with intelligence.* This is manifested in foresight, conception, pre-determination, selection. All these modes of intelligence are revealed in the processes of organic growth. We may consider, *first*, the putting together of the material structure. From crude aliment certain suitable elements are selected. These are chemically combined—sometimes not according to the order of affinities—and the molecules are arranged in cells, fibres, and membranes. Then the cells are built up in definite organic structures. Sometimes they are heaped together in a mass to form a pulp of cellular tissue. Sometimes multiplication of cells is restricted to one plane, and a cellular membrane results. Sometimes it is restricted to one line, and the cells becomes linearly arranged, as in the fibrillæ

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of muscles. The fibres are built in to form an interlacement among the organs, and the membranes line, enwrap, enclose, and protect. When we look through the structure of a dwelling-house in process of erection, we discover the analogies of all these organic structures. The bricks, the compounded mortar, the floors and partitions, the pipes, the rods and braces, the doorways, the roof, the external sheeting—these are all analogues of parts in the organic fabric. Who would venture to suggest that the power which built these walls and reared this edifice, the discernment and tact which guided the disposition of the matter, resided in the wood and stone and clay?

We may consider, *secondly*, the correlations of the separate structures to each other, and to their functional ends in the fabric. Tooth-tissue is formed in the jaws, and not in the liver. Feathers grow from the skin, and not from the walls of the heart. The lungs communicate with the trachea, and not with the stomach. The salivary glands are located at the commencement of the alimentary tract, and not under the arch of the foot. The fibrillated muscular tissue is formed in the places where muscles are needed to contract and dilate. Blood-vessels are built along the great natural tracts of outflow from the heart and return to the same. Calcified tissue is all reserved for the bony framework, and not deposited in the spleen or the heart. The whole fabric is a system of mutual correlations, and of fitness to the functional activities which constitute organic life.

We may consider, *thirdly*, the correlations of the total structure to ideal concepts. Comparative anatomy has shown that all animals are constituted in accordance with a few fundamental plans. One of these, to illustrate, is the vertebrated plan. This plan has characteristics which are as distinct, intelligible, and definable as those of the Gothic or Byzantine styles in architecture. Now when, in the embryo, the first stages of upbuilding are entered upon, every disposition of cells, every outline of an organ, is determined by the requirements of the plan to which the organism in its completeness is to conform. Here we see that an archetype is apprehended, and a completed structure conforming thereto is preconceived, and all the work is guided by a comparison between it and a plan which, real as it is, exists only in thought. Are these the activities of an unintelli-

gent agent? Manifestly the forces which build the organic fabric are guided by intelligence.

There is a grand and all-underlying plan which determines the order and method not only of inorganic but of all organic changes, whatever the structural plan of the fabric. This deep and universal plan is the method of evolution. If the conformity of one branch of the animal kingdom to its special archetype implies the exercise of intelligential functions, then, *a fortiori*, the conformity of all the branches of the animal and vegetal kingdoms, and of all the systems of the cosmic universe, to one and the same archetypal method of production and life implies the exercise of intelligence.

I am fully aware of objections made to these conclusions, but I consider them undiscriminating and invalid. It is said that correlations of structure are caused by environment. As each structure in the organism may be regarded a part of the environment of every other, I may generalize the whole question under the relation of environment. Now, I have attempted to show that nothing in the nature of environment can be causal. The true cause, acting in the organism, selects and builds according to the nature of the environment. That is, something which exerts no causal efficiency is, nevertheless, a rule of action for something which puts forth efficiency. The observance of a rule, the conformity to a coexistence, is an intelligential act. But the case is stronger. The conformity, many times, is in relation to an environment yet future—it is anticipatory; as when the lungs of the tadpole develop while yet the environment demands gills, and therefore exerts an opposing influence, if any. This, it is often said, is the result of heredity; the parents possessed lungs, and so must the offspring. But then the parents did not possess gills; and if it is said their former possession of gills entailed a hereditary predisposition to gills, then it seems to me admitted that something which exists only as a reminiscence, an obliterated organ, of which only the idea persists, has directed the physiological forces in the production of gills. But suppose the development of lungs in the tadpole is in obedience to the impulse of heredity. This means only that the offspring reproduces what was in the parent. But if we trace the lineage of an air-breathing

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frog backward, we reach an ancestry which only developed gills. Somewhere between the gill-using ancestor and the lung-using frog a great addition has been made, which could not have occurred under the law of heredity, since this transmits only identity. This great addition has sole relations to an atmosphere. If it did not begin to exist until an atmosphere necessitated lungs, it was not, as before argued, an atmosphere which produced them, but a new action of the physiological forces constituting a correlation to the atmosphere, and thus revealing that discernment which is an attribute of intelligence. If it is said the addition was acquired by differential increments extending through a long series of generations, the case is not altered to the least extent, for it is the sum of the increments which has to be accounted for; and besides, each infinitesimal increment is as truly a task beyond the powers of heredity as the total integral is. Each increment is something to be explained; and if the problem is not increased in difficulty, it can only be resolved, as before, by the recognition of causal activity in some immaterial subject.

I believe, therefore, we may rationally conclude that the causal agent acting in all those physiological processes which build up the organic fabric in correlation with the environment and in correlation with ideal plans is an immaterial agent, metaphysically objective to the minutest constituent of the material organism. It thus appears that the whole work of the derivation of species originates in a mysterious *immaterially grounded force*, which acts in the organism, and employs the physiological processes as instrumentalities in building up the fabric according to the nature of the concomitant *conditions*, and in conformity with archetypal conceptions which can only be formed, apprehended, and followed through the exercise of the powers of a psychic nature. In other words, the method and the doctrine of evolution, instead of implying materialistic monism or mechanical necessity, guide us inevitably beyond the domain of matter, and into the realm of intelligence and supramaterial being.

III. THEOLOGICAL CONSEQUENCES.—It is scarcely necessary to say that I make here no allusion to so-called "dogmatic

theology." I take the opportunity, however, to remind my hearers that several writers who have treated more or less directly the relations of science and theology, or science and religion, have assumed, apparently, that these two terms signify only a body of ecclesiastical beliefs and practices including, with those founded in reason, a mass of formulæ and rites which have no higher sanction than the authority of creeds, confessions, decrees, and the utterances of fathers, bishops, popes, councils, synods, and other mouthpieces of fallible human opinion. I have nothing to say here against the theology of tradition; but it may be proper to remind my audience that any supposed conflict between science and traditional theology must not be accounted a conflict between science and fundamental theology. As fundamental theology is the common basis of all shades of ecclesiastical belief, I consider it a service to religious truth to strengthen the claims of the science of divine existence upon the intelligent respect and reverence of my fellow-men.

1. *There must be a First Cause.* Evolution is a certain transformation of a succession of terms. There is no conceivable succession of terms which is not finite. Our earth, which is the only theatre of organic life known to us, is approaching a finality through various courses of change. Its surface is wearing out, and its lands becoming sea-sediments. Its progressive refrigeration will result in the complete absorption of atmosphere and water. Tidal action will slacken the rate of rotation until each side is turned alternately two weeks toward the scorching sun, and two weeks toward the cold regions of space. If this is not enough, the sun is destined to be extinguished, and the earth to be precipitated upon the central funeral pile of our system. Any one of these contingencies demonstrates that the duration of the habitable globe is limited. Equally clear are the evidences that the habitable condition has not continued from an indefinite past. Necessarily, then, the organic series is limited at both extremities. The world had a beginning, and therefore a first causation.

If this world has descended by continuity from any previous condition, however remote, the same mode of reasoning makes it evident that the absolute commencement of the evolution cannot be infinitely removed in time. As the same must be

predicated of every cosmical evolution, it follows that the material universe had a beginning and a First Cause. That beginning may be indefinitely remote, and to all finite apprehension infinitely remote, yet on the grounds of a deduction from scientific data we are authorized to affirm that primal causation was logically antecedent to all cosmical existence.

This conclusion, it may be added, accords with that datum of pure reason which predicates antecedent causality for all conditioned existence.

2. *The immaterial cause of derivation acts constantly, not periodically.* If new species are not created suddenly, but have been developed slowly, then the creative efficiency acts continuously; and creation of species is the same act as sustentation of species. In other words, derivation implies continual creation, instead of occasional creation. Derivation contemplates Supreme Efficiency as *now* and *here*, in every organism in action; not as exerted at some remote unknown epoch, and ever since withdrawn from activity. This view brings the divine presence into close and intimate relations with the actual world, and interprets all the phenomena of organization as revelations of the supreme mind and will.

3. *The cause of derivation possesses indefinite power and intelligence.* Power is revealed in the physical movements and changes of the universe; intelligence, in the presence of plans and correlations, both in the world at large and in the physiological activities already discussed. Intelligence, moreover, is involved in every act of original causation—that is, in all the causation which maintains the order of the natural world. But intelligence and power thus revealed are bounded by the limits of the theatre in which they are displayed. They are mundane and not infinite. The being possessing such power and intelligence is a demiurge, and not an unconditioned Creator.

4. *The cause of derivation is infinite in attributes.* (1) As we cannot rationally admit the uncreated existence of space and duration—I speak only for myself—and as we are compelled to think them absolutely unlimited in extension and protension, the First Cause of immensity and eternity must be infinite and absolute. (2) There are certain ontological necessities of thought which guide us to the same conclusion. We find in existence

in our minds certain necessary ideas of infinity, eternity, ultimate unity, and the absolute. These, certainly, are not definable ideas, and, as our cognition of them must fall immeasurably short of the reality, the attributes thus named cannot be perfectly known, and in such sense may be admitted "unknowable." But we have necessarily some *notion* of them; we are certain that such attributes are true predicates. We also find in consciousness the necessary idea of substance or reality, or ground of attributes. By authority of the principle of substance, we affirm that if infinity is a true predicate, it is a predicate of something. There is some *being* who is infinite. So, without ratiocination we discover existent in our minds the idea of an infinite being, and the assumption that an Infinite Being exists. These are rational data of thought which we find associated with the other rational data which enter into all our thinking and life. We cannot reject them as invalid on any ground which would not reject all our intuitions and reduce all existence to nihility.

5. *The infinite cause of the world, revealed in evolution, is a personality.* We reach the conclusion in several ways. (1) The necessary idea of personality combined with the necessary idea of substance furnishes us personality as an attribute of the Infinite Being. (2) Personality is the product of three factors, intellect, sensibility, and will. These three factors are present in every act of original causation, as I have shown. The Infinite Cause is, therefore, an infinite personality. (3) Every causal act implies, as before said, the subject acting, and real or potential objectivity, or capacity for other existence, toward which the action is directed. The world, therefore, is not to be confounded with the cause of the world.

If some of these deductions are not based strictly on the doctrine of evolution, my hearers will understand that they legitimately supplement that doctrine.

I hope I have shown, as I promised, that evolution does not imply materialism, nor a pure mechanism, nor any form of monism, nor any grim and godless system which robs half our nature of its meaning and right of exercise. I hope I have made it appear that all irreligious interpretations are illogical and in-

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defensible, as well as repulsive to our religious instincts. I hope, finally, I may have convinced you that evolution presents the sublimest views of the unity of the world, the most impressive conceptions of the relation of Supreme Cause to the world, and the tenderest and most awe-inspiring consciousness of our nearness to God in all the activities of that glorious system of things in which we have the honor to be a part and to act apart.

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SCIENCE AND REVELATION.

[A Lecture delivered before the Summer School of Christian Philosophy, 20th July, 1881.]

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WE are assembled in a Summer School of Christian Philosophy. Philosophy was defined a great while ago as "the science of sciences;" in other words, it is the universal science which gathers up in unity all the special sciences, or branches of knowledge, by means of the relations which subsist between them. Christian philosophy, then, is the science of the relations between Christian truths, or ideas, and other branches of knowledge; and the subject upon which I shall have the happiness to discourse before you this morning is that of the relations between divine revelation and science in general, with special reference, however, to the physical sciences.

I begin, therefore, with the observation that the scepticism and infidelity of modern times seem to find their strongest defences and support in the notion that the teachings of revelation are somehow inconsistent with those of science. The prevalence of this notion has been productive of very deplorable consequences both to science and religion, and hence it is a matter of great importance that whatever may contribute in the least to the healing of this baleful schism should be clearly exhibited and universally recognized. Nor should we permit ourselves to doubt but that this result will be ultimately realized, for science and religion cannot remain forever at feud with each other. There must be some common ground where they can meet, and where reasonable, well-disposed people can stand without prejudice against either, with their minds impartially

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open to the benign influences of both these illustrious twin-sisters and grand sources of truth and human well-being.

Indeed it is quite evident that this controversy has arisen, in part at least, from the fact that both scientists and theologians have transcended each their own legitimate department of knowledge and invaded the province or domain of the others. Hence it is that science frequently presumes to question, and even to deny, the most fundamental truths of religion, and religion, the most certain results of science. Examples of this on either side might easily be given, such as, on the part of science, the assumption—for it is no more—of absolute uniformity in all the operations of divine power, so that miracles and answers to prayer are held to be impossible; and, on the part of religion, such interpretations of Scripture as are diametrically opposed to the established results of geological science within its own proper domain.

Evidently, therefore, this schism can never be healed until religion and science shall come to recognize each other as original and independent sources of truth, and as ultimate authorities, each within its own rigorously defined sphere. But where shall the line be drawn between them? This is the grave question which I undertake to answer in this lecture, not indeed directly, but I shall try to establish a principle of interpretation which, consistently applied to the Holy Scriptures, will leave little or no ground for religion to call in question the truths of science, nor for science, the truths of revelation; and this not as anything new, but only as requiring a more rigorous verification and a more consistent application than it has hitherto received.

This principle may be curtly enunciated as follows: *The Holy Scriptures were given to reveal moral and spiritual truths; nor was it any part of their object to reveal the truths of science, upon which, consequently, they are no authority.*

A very slight acquaintance with the origin, style, and contents of the Christian records is enough to satisfy any one that it was no part of their object to reveal the truths of science. For, as to their origin, they were communicated to mankind through the family or posterity of a nomad sheik, than whom no people of their times were more utterly destitute of scientific culture. If

their object had been to include precise and infallible statements on matters of science, probably the Greeks would have been chosen as the medium of communication, for scientific tendencies and adaptations were as characteristic of the Greek mind as they were foreign to the Jew. As to their style, it will require to be more fully exhibited hereafter, but we may observe here that it is never scientific, but always and eminently popular. And as to their contents, these are chiefly great moral and spiritual truths, such as the being, personality, and attributes of God, his creation and providential government of the universe, the immutable obligation of his moral laws, the sin, fall, and redemption of man. Such truths as these are the great burden of the Christian Scriptures, and the great object of Christian faith; and whatever there may be in the Bible which does not bear upon them must rationally be regarded as of secondary importance.

Yet the failure to recognize this, or the notion that the Scripture must be taken as an infallible authority not only upon moral and spiritual but also upon scientific questions—or, at least, that its statements and allusions with respect to physical phenomena must somehow be harmonized with the results of science—this notion extensively prevails to the injury of both science and religion. For not only does it promote scientific scepticism and put into its hands its keenest weapons, but also it vitiates and poisons theology itself, inasmuch as, on this ground, the theologian finds himself under a necessity to defend all Scriptural allusions to physical phenomena as scientifically accurate, and his own interpretation of them as essential to faith in the word of God. Hence, whenever science establishes any new truth which bears upon them so that it can no longer be doubted by reasonable people, he is sorely tempted to foist into the words of Scripture a sense in harmony with it which they were never intended to bear. In this way all true principles of exegesis are confounded in order to make God's revelation teach whatever human science, in its ever progressive development and unceasing changes, may at any time be thought to require. And what is still worse, if possible, where this expedient would seem to be inapplicable, theologians have often brought themselves to deny the most certain results of science

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in order to maintain their faith in revelation. They have even been heard to say to scientists, "If you prove your point, we must give up our Bible." And after the point has been proved and universally accepted, the scientist has been heard to reply, "Why do you not give up your Bible as you said you would?" Thus faith in divine revelation is made an object of mockery.

As an example of this last case I may be allowed to recall here the well-known story of Galileo, the significance of which, as it would seem, has never yet been fully appreciated. For in former times, as you know, the Scriptures were universally understood to teach the geocentric system of the physical universe; namely, that the earth was the immovable centre of motion to the sun, moon, and stars. But when Galileo demonstrated that this construction of the cosmical bodies was no longer tenable, and substituted in its place the solicentric system, proving that the earth and other planets revolved around the sun, the alarm which was awakened in the minds of theologians by this complete revolution in astronomical science is hardly conceivable by us at this day. Consequently they resisted it with all their immense influence; and having "the powers that be" on their side at the time, they compelled "this foremost man of all the world" to repudiate his heresy in order to save his life. Now who can appreciate the enormity of such a scandal as this? Yet the lesson which it inculcates has been very imperfectly learned. For similar though hardly such extreme treatment of scientific truths has been witnessed in our day. We have had the most embittered discussions of the age of the earth, the length of time during which it has been inhabited by man, and other matters of science purely, which the theologians long ago had determined and settled by the authority of Scripture.

In allusion to such scandals as these the venerable Archibald Alexander, formerly Professor of Theology in the Seminary at Princeton, was accustomed to say to his classes, "Young gentlemen, you should never say to the men of science, If you prove this or that, we must give up our Bible. On the contrary, you ought to say, Go on, gentlemen; make all the discoveries you can, for we are not afraid of the truth. But you will please to remember that whilst you are disputing among

yourselves, we are not obliged to accept the views of any party. It is our place to wait until you have come to an agreement; and when you have established any new truth so that you yourselves no longer dispute about it, we will accept it without fear that it will have any bad effect on our faith. For we hold that the author of nature and of revelation is one and the same infinitely wise and good Being, and, consequently, that true science and true religion can never have any quarrel with each other."

Now if this beautiful rule of practical wisdom were consistently followed, it would leave little or no ground of controversy between science and revelation, and the most perfect harmony would be manifested between these two great and co-ordinate factors of Christian civilization; between which, in fact, there never was any opposition but such as has arisen either from "science falsely so called," or from misunderstandings and perversions of the word of God.

The principle of interpretation which has thus been enunciated and developed we shall find strongly confirmed and its applications illustrated, if we consider more particularly the style of allusion and statement with respect to physical phenomena which prevails in the Scriptures. For there was an obvious necessity that such allusions should occur on almost every page from the multitude of physical objects which required to be mentioned. And these objects had to be spoken of by name long before scientific nomenclatures were invented—before there was any such thing as science in the world. Let us ask, then, in what forms of expression ought we to expect that these unavoidable allusions and statements with respect to the legitimate subjects for future scientific investigation would be made—whether in language scientifically correct and adequate, such that no subsequent progress should ever be able to criticise it, or, in popular language, such as prevailed at the time the revelations were given, and such as the most illiterate and ignorant people could understand? I think you all know which to anticipate, and I shall now undertake to demonstrate that the former method or procedure was altogether impracticable, and that the latter was the only one which could be followed.

In the first place, then, if these Scriptural allusions to physical phenomena had been made in terms scientifically correct and

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adequate, the Bible would have been unintelligible to all the generations of mankind who lived and died before the birth of science, and still such to the vast multitudes who are destitute of scientific culture. In proof of this you need only consider that a scientific expression for the phenomena of the sun's rising and setting would be something like this: The earth revolving on its axis reveals and hides the sun. But no one at the time the Scriptures were given could have understood what was meant by such words as these, and the expression itself is so clumsy that even we cannot use it; we continue to say, The sun rises and sets, although we know that it is as far as possible from being scientifically correct. If, then, scientific language had been employed in reference to these physical phenomena which had to be mentioned or alluded to on every page, and almost in every sentence, the Scriptures would have been unintelligible at the time they were written, and, no doubt, would have been universally rejected as the ravings of insanity. If they could have been preserved, which is hardly supposable, no one could have understood them until they should have come to be interpreted by modern science.

Nor would they have been any more intelligible to us at this day than to those of former ages. For science is not yet perfect in its nomenclature, nor ever indeed can be. It is constantly making progress and introducing changes in its modes of conceiving and expressing physical objects, and doubtless it will always continue to do so. Thus what was lately called caloric is now called a mode or form of motion, and the word caloric is no longer used. Light, also, which was formerly regarded as a fluid, is now the result of certain vibrations or oscillations. Consequently the time may come, nay, is sure to come, when many of the now current forms of expression in science will be found to be incorrect or inadequate, involving more or less of erroneous conception and theory, and will be superseded by others in accordance with more advanced knowledge. Thus we see that these allusions in the Scriptures to physical phenomena, in order that they should be absolutely correct and forever unchangeable, must have been made in forms of expression corresponding, not to the present, but to the still future and very last developments of science; in which

case, they would have been unintelligible to us, and to how many of the coming generations of mankind we cannot tell.

Moreover, it is evident that a scientific expression of any great physical phenomenon, such as the rotating earth reveals and hides the sun, cannot be understood without a knowledge of the cosmical theory to which it belongs. Hence it follows that, in order to meet this difficulty, it would have been necessary for the Scriptures to reveal, not only the great truths of religion, but also the perfect and final system of science. But obviously this was not the object for which they were given, and the attempt at such a revelation would have introduced inconceivably greater difficulties than it could have removed. It would have been encumbered by at least three insuperable difficulties. For (1) it would have made the Bible of such enormous bulk that, it is safe to say, no one person could ever have read it through. (2) Such a revelation of science would itself have been unintelligible. For that vast and complex and abstruse system of knowledge which is only symbolized, not expressed, by the word, science, however clearly it might have been revealed from heaven, could no more have been understood in the early stages of human development than it can be now by little children. If, e.g., all that is signified to our minds by the mariner's compass, naval architecture, steam navigation, and other similar expressions, had been divinely revealed with the utmost possible fulness and clearness to Cimon or Themistocles, those old Greek admirals whose most daring voyages hugged the shores of the Mediterranean, and who had hardly ever been out of sight of land in their lives, is it conceivable that they could have comprehended it? This would have been utterly impossible, because the human mind itself is the subject of development, and has to grow up by slow degrees in order to become capable of mastering such ideas. It is impossible for man, even by the aid of any conceivable revelation, to bridge the great ocean of thought which lies between his knowledge at any given period and that to which he subsequently arrives in the progress of thousands of years. But (3) if we suppose that such a revelation had been given and could have been comprehended, it would have superseded that strenuous exercise of the human faculties in experiment, research, and

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reasoning which, according to all experience, is indispensable to their development and growth. For the search after truth has been held by some of the greatest minds the world has ever seen to be more conducive to mental power than the truth itself. In the words of Lessing: "If you place before me the truth, on the one hand, and the search for truth, on the other, I take the search." This may be an over-statement, but there lies in it this much of truth, at least, that as man is constituted, his intellectual faculties could never have been developed so as to comprehend science otherwise than by means of that laborious exertion and exercise of them through which all his discoveries have been made and all his progress achieved.

Hence it appears that there were the best of reasons why the revelation did not, and could not, make the necessary allusions and statements with respect to physical phenomena in scientific language. There was an absolute necessity that they should be managed in some other way; and we pass on now to the consideration of this other method which was actually adopted, and which, as I shall endeavor to demonstrate, is followed out with perfect consistency from the first chapter of Genesis to the last of the Apocalypse.

Here, then, recurring to the typical expression, The sun rises and sets, we see that it is derived from the impression which the phenomena make upon the sense of sight—from that which appears, and not at all from the scientific truth which underlies the appearance. Now this impression, you will observe, is necessarily the same for all creatures who can see, at all times, and all places on the earth. Consequently the expression which is derived from it must always have been, and must forever continue to be, universally intelligible. In whatever language of articulately speaking man it may be said, The sun rises and sets, even the most ignorant and stupid people will always understand what is meant. Hence we may safely predict that this expression will continue to hold its ground through all possible changes in the scientific exploration and comprehension of the phenomena which it represents. For human language itself originated in, and draws its perennial nourishment from, the impressions which nature makes upon man's senses. In the Hebrew of the Old Testament, however, the corresponding expression is

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slightly different; it is in this form: "The sun goes forth and enters in." In this case the impression made upon the senses is somewhat modified by an underlying conception in explanation of the phenomena which seems to have prevailed at the time, and which is more fully expressed in the words of the Psalmist: "The sun, which is as a bridegroom coming out of his chamber, and rejoiceth as a strong man to run a race." For the ancient Hebrews, as other peoples of their time, seem to have conceived of the sun as having his sleeping-chamber under the earth, from which at one door he came forth in the morning, and into which at the opposite door he re-entered in the evening. Closely analyzed, this expresssion will be found in part sensuous and in part theoretical; which, no doubt, is the reason why it has not been able to maintain its ground, but has everywhere given place to the purely sensuous form which we employ. If now we had time to examine all the allusions and statements with respect to physical phenomena which occur in the Scriptures, we should find that, without a single exception, they are made in forms of expression similar to this by which the sun's apparent motion is represented; that is to say, in forms originally derived from the impressions which the phenomena make upon the senses, but often modified by theoretical conceptions in explanation of these phenomena which prevailed among the people to whom the revelation was immediately communicated. It now remains to furnish the proof of this statement, which will consist of a few examples taken almost at random from literally thousands precisely similar.

(1) First, then, the inspired writers, whether of the Old Testament or the New, certainly had no knowledge of the true relations of the sun to the planetary system, nor of those which the heavenly bodies in general bear to each other. For it did not enter into the purely moral and spiritual object of the revelation that this knowledge should be communicated to them; and any attempt to reveal a complete science would, as we have seen, have met with insuperable difficulties. Consequently they, like other people of their times, conceived of the earth as the greatest and most important of all the cosmical bodies, of the sun, moon, and stars as dependent upon it, and as created for the benefit of its inhabitants. In strict accordance with this

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conception, they never allude to the sun as the centre of attraction or motion to the planetary worlds, but everywhere speak of the heavenly bodies as created and placed in the firmament "to give light upon the earth" and "for signs and for seasons and for days and years."

(2) In the second place, the sacred writers evidently conceived of the earth as a solid, immovable body, with a plane or, perhaps, a slightly convex surface. This, indeed, was the conception of it which universally prevailed in ancient times. Consequently, as was inevitable, speculation abounded as to what it rested on, or by what its weight was supported. Some imagined one thing and some another, but no satisfactory account of the matter could be given, for, obviously, the difficulty did not admit of a final solution. In order to illustrate this conception I subjoin here an old Hindoo scheme of the universe.

In this scheme we have first of all a triangle from which a glory is streaming, and which among the Hindoos was an ever-recurring symbol of the *Trimurti*, or three-form, ineffable nature of the Deity. For after all that has been written in explanation of this mysterious symbol, it is more than probable that a dim shadow of the Triune Jehovah had somehow fallen upon the minds of this wonderful heathen people. Immediately below this triangle we have seven heavens—each of the superior ones resting upon the next under it—which were believed to be the abodes of those *rishis* or sages who, by their knowledge and austerities, rather than by their virtues, had raised themselves to an equality with the gods. The lowest heaven rests upon celestial clouds; the clouds upon a supernal ocean; this supernal ocean upon a solid sky or firmament; the firmament upon a troop of elephants with their feet upon the earth; the earth, which is convex above and concave beneath, rests upon four other mighty elephants, one at each of the four cardinal points of the compass; the space between them is *patala*, i.e., the hells; these elephants stand on the back of a great tortoise, which, finally, rests upon the folds of an enormous serpent, which, after furnishing this support, forms a circle around the whole vast scheme with its extremities meeting above the triangle, on which it seems to hang and by which the weight of the universe thus represented is

upborne. In this way these old thinkers, grappling with this problem, conceived of all the spiritual and material worlds as depending ultimately upon one triune, ineffable, divine Being. The whole scheme, as you see, combines the puerile with the sublime in a truly wonderful manner.

Now it is very remarkable that the Christian Scriptures are free from all such puerilities. They leave the whole matter in that insoluble mystery which belongs to this conception of the earth as an immovable body. In many passages of great sublimity they represent the question as to what it was founded on as one of the deep mysteries of God. In one of these God is introduced rebuking the rebellious spirit of Job as follows: "Where wast thou when I laid the foundations of the earth? Declare, if thou hast understanding, who hath laid the measures thereof, if thou knowest. Or who hath stretched the measuring line upon it? Whereupon are the foundations thereof fastened? Or who hath laid the corner-stone thereof?" For the attempt to explain such declarations as mere figures of speech, or in any way consistent with the fact that the earth has no foundations, is worse than idle—a perversion of language such that if similar methods be applied to the revelations of moral and spiritual truth, the result must be that we shall get out of the word of God just what we please. Nor are the representations which occur elsewhere, such as "He hangeth the earth upon nothing," to be interpreted in opposition to the plain sense of the preceding citation, and of innumerable other passages of similar import, as if they were intended to harmonize with our knowledge that the earth is a globe suspended in space by gravitation; but they are to be understood as simply expressive of the mystery of the thing as it lay before the minds of the sacred writers.

(3) A third conception in explanation of physical phenomena which prevailed among the ancient Hebrews was that of a great body of water existing under the earth. It was in this way that they accounted for springs and wells. For the rising of the water out of the earth, even in the hills and summits of the highest mountains, was a great mystery to the old world, and is frequently alluded to in the Scriptures as a wonderful manifestation of the power of God. They speak of it as in the

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following words: "He [God] sendeth the springs into the valleys which run [literally, which break, or rise] among the hills." Now the sacred writers make no attempt to correct this erroneous notion in science, because that was not included in the object for which they were inspired. On the contrary, they express themselves in full accordance with it in a multitude of places, as in the following instances: "The earth above the waters." . . . . "The deep that lieth under." . . . . "The waters under the earth." . . . . "The fountains of the great deep."

(4) A fourth conception which seems to have prevailed universally in ancient times, as it still does wherever science has made little or no progress, was that of the sky as a solid substance or firmament, properly so called. We have seen it in our Hindoo scheme. Children always have this conception of the sky before they are otherwise instructed, and savages cannot be convinced to the contrary. The reason is that the deep blue color of the heavens makes this impression upon the sense of sight. For how can mere void space have any color? We know, indeed, that this is due to the atmosphere which surrounds the earth, and I myself have seen and handled a transparent gas similar to atmospheric air, condensed and frozen solid by an experiment in the laboratory, and its color was precisely the deep blue of the sky on a clear day. Hence the oldest names of the blue vault above us, in many languages and probably in all, either express or imply its solidity. This is the case with our word heaven, which signifies primarily that which has been heaved up by the exertion of strength or force, and which, therefore, has weight and solidity. Also the word, firmament, in the Mosaic cosmogony and elsewhere, is the exact equivalent of the Greek στερέωμα and of the Hebrew רָקִיעַ which it is used to translate. Each of these words properly signifies that which is solid, compact, firm. They cannot be soundly interpreted in the sense of a void expanse, as some scholars, in their excess of zeal to harmonize the Scriptural allusions to physical phenomena with the results of modern science, would maintain. This interpretation is inconsistent, not only with the proper meaning of the words, but also, as we shall see here-

after, with the connections in which they stand. For the Hebrew word, of which the Greek and English are, of course, simply translations, is derived from a root which signifies to expand by hammering out, as iron, or gold, or any other metal is expanded into solid sheets. Hence it is properly rendered in the Greek version of the Scriptures by the word στερέωμα, and in our English Bible by firmament, neither of which has any meaning apart from the idea of solidity. Accordingly we find allusions or statements expressing or implying this conception of the sky on almost every page of the Scriptures, such as the following: "Hast thou with him [God] spread out the sky, which is strong, as a molten looking-glass? For this molten mirror here, as elsewhere, must of course be understood as of polished metal; and we shall see directly why this quality of strength is attributed to the firmament. Again: "They saw the God of Israel, and there was under his feet, as it were, a paved work of a sapphire stone, and, as it were, the body [literally the bone] of heaven." The manner in which the firmament is spoken of in the Mosaic cosmogony will require to be examined hereafter, and need not be further referred to here, except to state that the words which represent the birds as flying "in the open firmament of heaven" are now recognized by all Hebrew scholars as a mistranslation. "The open firmament" should have been rendered "in the face of the firmament," i.e. under it.

(5) Still another conception in explanation of physical phenomena which seems to have prevailed universally in ancient times was that above the firmament, in which Moses expressly states that the stars were set or fixed—and this, by the way, is the origin of the expression "the fixed stars," which we still retain, though in a different sense—that above the solid sky, and supported by it, there was another great body of water corresponding to "the waters under the earth," and identical with the supernal ocean of the Hindoos. This seems to have been the common explanation of the phenomena of rain. For as the water in springs and wells was supposed to come from "the deep that lieth under," so the rain was supposed to fall from "the waters which were above the firmament." The relation which the clouds

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bore to the rain in this conception does not fully appear. Perhaps they were regarded as a kind of sieve by which the water, as it tumbled from the firmament, was separated into drops and sprinkled over the earth in order to its more effectual fertilization. There may be an allusion to this in the words: "He [God] maketh small the drops of water . . . which the clouds drop and distil."

Now the allusions and statements which either express or imply this conception of a great body of water above the firmament are almost innumerable. The following are examples: "Praise him [God], ye heaven of heavens, and ye waters that be above the heavens." . . . . "And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters. And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament." Here, now, is one of those cases previously alluded to in which, if it be ever possible to determine the sense of a word from the connection in which it stands, this word, firmanent, cannot have the meaning of a void expanse. For here God is represented as being occupied the whole of the second of these days of creation in creating this firmament —he did nothing else on that day. But how can a mere void expanse, i.e. nothing at all, be spoken of as a work of creation, as something which God created, and which took him the whole of one of these days to create? And this difficulty is greatly enhanced, as you see, by taking these six days in the sense of geologic periods of immense duration. Besides this, the firmament is here represented as created and placed to divide the waters below from those above it. But there are no waters above that in which the fixed stars are set, although this conception gives us the reason why the quality of strength is attributed to it in a previous quotation, i.e. because it was supposed to sustain the weight of a superincumbent ocean.

But the most striking and significant allusions to these two great bodies of water above the firmament and under the earth occur in the account of the deluge, where it is stated that "all the fountains of the great deep were broken up," so that the waters under the earth burst up in great floods; and that "the

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windows of heaven [literally, the flood-gates] were opened," so that the waters which were above the firmament came down in mighty torrents. In this way the deluge is accounted for; and if we fail to recognize the conception of the physical universe to which these expressions refer, the sublimity of this whole picture is well-nigh lost.

Besides such allusions and statements as these with respect to great cosmical phenomena, we find similar references to minor particulars, of which it must suffice to reproduce here two or three examples.

(1) The first of these I take from the book of Job, where it is said of "the ostrich" that she "leaveth her eggs in the earth, and warmeth them in the dust, and forgetteth that the foot may crush them, or that the wild beast may break them. She is hardened against her young ones as though they were not hers. Her labor is vain, because God hath deprived her of wisdom, neither hath he imparted to her understanding." Now it is quite true that the ostrich sometimes leaves her nest in the noon of the tropical day, as do other birds, that their eggs may not be actually cooked by the heat of their bodies. But this passage does not exhibit her true character as we know it from the testimony of a great number of perfectly trustworthy eye-witnesses, for she is, in fact, a most affectionate and prudent mother. She broods on her eggs with the utmost assiduity. When she leaves them to procure food or water, the male bird commonly takes her place until she returns. They both fight desperately, even to the loss of their own lives, in defence of their young; and they resort to the most subtle strategems to deceive the hunter; for, like the lapwing and some other birds, they pretend to be wounded or crippled and go fluttering and floundering along upon the ground, in order to draw the hunter away from their young ones in pursuit of themselves. In all this we do not see a creature which 'God has deprived of wisdom and understanding,' nor one "hardened against her young ones as though they were not hers."

(2) Again, we find that certain animals of the pachyderm and rodent classes are prohibited in the Mosaic law as unclean, on the ground that, though ruminants, they are not cloven-footed.

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Thus it is said: "The coney, because he cheweth the cud but divideth not the hoof, he is unclean to you; and the hare, because he cheweth the cud but divideth not the hoof, he is unclean to you." Now the word שָׁפָן, *shaphan*, here erroneously translated coney, designates, as is generally agreed, a little pachyderm animal resembling the coney, which last, as also the hare, are rodents. Both the *shaphan* and the hare are still believed by the Arabs to be ruminants, though neither of them has the fourfold stomach nor the other traits of physical organization which are characteristic of all animals that chew the cud. This popular error originated, no doubt, from the fact that the rodents have a peculiar motion of the cheeks and mouth, which is produced by rubbing the edges of their cutting-teeth upon each other, and which gives them a striking appearance as if they were chewing the cud. Now Moses speaks of them according to this appearance, and not at all according to the scientific truth which underlies it, with which here, as elsewhere, he does not concern himself. By this appearance he classes them as ruminants, for the obvious reason that the distinction between clean and unclean was one which the people had constantly to make upon the evidence of such outward signs; and if they had been allowed to disregard them in such cases as these, it would have been well-nigh impossible to have kept up the distinction in other cases.

(3) To these it may be added that the doing of certain things is often claimed as the exclusive prerogative of God, to which human science and power have since been found adequate. For the question is addressed to Job: "Canst thou send lightnings, that they may go and say unto thee, Here we are?" Now it seems impossible to choose words which should more precisely describe what we are doing every day by means of the electric telegraph. The lightnings do now say to us, Here we are, send us, and we send them with our messages from continent to continent and from pole to pole.

These few examples are all that I have time to give; but they are sufficient, I trust, to illustrate and verify my proposition, that in the Scriptures natural phenomena are always spoken of in forms of expression originally derived from the im-

pressions which they make upon the senses, but often modified by theoretical conceptions in explanation of the phenomena, such as prevailed among the people to whom the revelation was at first communicated. For certainly it was no object of the sacred writers to correct these impressions or conceptions, however erroneous they might be. The limitations imposed upon them by their great moral and spiritual object made it absolutely essential that they should never concern themselves with the scientific truths which underlie the phenomena of the physical world, but should leave all these to be discovered and expounded by science. For if they had spoken of natural objects otherwise than in free and popular language—if they had undertaken to correct all the errors with respect to them which prevailed—as we have seen, there would have been no end to the Bible, neither could it have been understood—it would have been a sealed book to those who first received it, also to us at the present time, and to how many of the future generations of mankind no one can tell.

But I do not claim that this view is free from difficulties. For it may be objected against it that, in the attempt to distinguish between what is of moral and spiritual import in the Scriptures and that which is not, we must be liable to very deleterious errors; also, that the two spheres of faith and science are not absolutely exclusive of, but, to some extent at least, do interpenetrate and overlap upon each other; moreover, that the principle of interpretation for which I here contend implies a low view of inspiration; and finally, that it cannot be applied to the Mosaic cosmogony without impairing its claims upon our faith as a divine revelation. Now it must be conceded that these are grave objections, and require to be fairly appreciated.

(1) First, then, I frankly admit that some matters of faith do fall within the purview of science. But this is a difficulty which cannot be wholly avoided, whatever view we take of the subject. For, in any case, physical science, within her own legitimate sphere, which is that of determining the laws of nature, may have something to say on the question of miracles, as also upon superstition and other similar matters. But the principle which I here advocate has this advantage over all others, that it

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reduces to a minimum the number of those questions in which it may be claimed that faith and science are both concerned. In fact, it leaves very few, and these such as are most easily defended, in which the most sceptical science can have any temptation to deny what a true faith in the word of God must ever maintain.

(2) In the second place, our liability to error in distinguishing between that in the Word which is moral and spiritual and that which is not, does not seem to be any greater than it is in the distinction which we have constantly to make between fundamentals or essentials and matters which are of secondary importance. For some things "the Scriptures principally teach;" other things are not principal, but subordinate. In either case, however, the sole question for us is, whether or not God has laid upon us the responsibility of making the distinction. And in proof that he has, in this case, we have the whole preceding argument, the force of which, however, we cannot fairly appreciate without putting ourselves on our guard against that universal temptation which arises from our natural dread of responsibility; for we have the most sorrowful evidence that there is a deep longing in the human heart for a more comprehensibly infallible revelation than that which God has seen fit to give us. Great moral and spiritual truths do not satisfy this morbid craving. We want a Bible alike infallible in matters of science as in matters of faith. We want an infallible church to determine for us what the Bible teaches, and to decide all our perplexing cases of conscience. This is human nature. And it is the claim to such infallibility by the Roman Church which, as much, perhaps, as anything else, attracts the ignorant multitudes who submit their minds to her authority and follow her banner. For she releases them from the painful responsibility of thought and of determining for themselves, from the teaching of the Word, what they are to believe concerning God and what duties he requires at their hands. We shall err if we think ourselves exempt from this temptation. It is indispensable that we guard ourselves against it if we would appreciate at its full value the evidence here submitted, that God has laid upon us the solemn responsibility of distinguishing between that in his

Word which is moral and spiritual and that which is, so to speak, the material framework in which his saving truth is exhibited to our minds.

(3) In the third place, all that has just been said is of equal force against the objection that our principle of interpretation implies low views of inspiration. For the real question, surely, is not one of high or low, but, simply, what is the true view? And, probably, neither the highest nor the lowest is the truest. The former, indeed, would relieve us of the greatest weight of responsibility, but the latter would go far to rob us of the word of God. The antecedent probability would seem to be in favor of a middle course, which is proverbially the safest:

In mediis tutissimus ibis:

in which the most thoughtful and judicious have ever been found. But however this may be, it certainly is both unreasonable and unfair to hold the Scriptures responsible for infallible accuracy of statement and allusion in matters which manifestly they were not given to teach. The consistent application of the principle which I here advocate cannot affect our views of inspiration any more than they are affected by our interpretation of the expression, The sun rises and sets, or goes forth and enters in. And upon what rational grounds can we claim that the word of God must harmonize with the results of modern science in other similar allusions with more precision than it does in this typical case?

(4) Finally, the difficulties in applying this principle to the Mosaic cosmogony, which has been so often assailed and defended by arguments alike unsound, are, no doubt, the greatest of all. Yet here, again, it is unreasonable to require that the Bible, in this its first chapter, should speak of physical phenomena in language scientifically correct and adequate, when it does this nowhere else. Nor is it possible so to interpret its words without imposing upon them a sense which they were never intended to bear, nor without great peril to important moral and spiritual interests. In fact, such interpretations introduce far greater difficulties than those which they claim to remove. For

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the view which is now commonly adopted by those who undertake to reconcile the cosmogony with modern science includes the following particulars: Moses, they tell us, exhibits the creation, not as it actually took place, but as it would have appeared to an observer stationed on the earth to witness it. What he calls the six days of creation were geologic eras of immense duration; by the word, firmament, we are to understand the void expanse; the words *create* and *make* are to be distinguished from each other, the former as signifying creation properly so called, and the latter formation out of pre-existing materials, or, simply, causing to appear. In support of this view much stress is laid upon the order of creation, which, it is claimed, may be made to agree with science.

Now against all this I urge the following counter-objections: (1) The harshness and incongruity of the supposition that the creation is here represented as it would have appeared to an observer on the earth, inasmuch as, when it commenced, there was no earth, and if there had been there was no observer to occupy it as a point of observation. (2) The order of creation here given does not agree with that of science, in that it represents the sun as created on the fourth day and the vegetable world on the third; whereas we know that the plants depend for their existence on the light and heat of the sun, and could not have lived and flourished through a whole geologic age before he was created. Besides this, we have the cosmical dependence of the earth upon the sun as its centre of attraction and motion, which renders it impossible to conceive of it as existing three or four geologic ages before the sun. But in order to meet this difficulty the supposition has been devised that the sun was not actually created on the fourth day, but only made his first appearance through the clouds to the hypothetical observer some time in the fourth period; and to bolster up this supposition the distinction is invented between *create* and *make*, which latter word is here applied to all the heavenly bodies. But this distinction cannot be maintained; it is perfectly arbitrary; the two words, with all their derivatives, are used as equivalents, both in this account and throughout the Scriptures, as in the following examples:

"God created the heavens and the earth.". . . . "The Lord God made the earth and the heavens.". . . . "Remember thy Creator." . . . . "Let us kneel before the Lord our Maker." Moreover, God is said to have "created" the living creatures on the fifth day, where, according to this distinction, the word, made, ought to have been used, as it is in the case of originating vegetable life. Since, then, these words are everywhere used as equivalents, if one of them be thus limited to the sense of forming or causing to appear, the other may be also; in which case there may never have been any true or proper creation, but matter may be eternal. This is one of the important truths which are imperilled by this method of interpretation. (3) The objections to understanding the word firmament in the sense of a void expanse have been already given, and I need not repeat them here. (4) It remains only to point out that the word, day, is here clearly defined in its common meaning by the explicit statement that each of the six days had its morning and evening; and still more significantly by the consecration of the seventh as a Sabbath of rest for all mankind. For if this seventh day be understood as of a different kind from the preceding six, the most fundamental law of logical analysis, that all the parts into which any given theme is analyzed must be obtained by application of one and the same principle, is violated. If the first six days be taken as geologic eras, and the seventh as a period of twenty-four hours, we have seven parts which cannot be obtained from the theme by the application of any one principle of analysis. The force of this objection will be best appreciated by students of logic and rhetoric, when their attention is called to this Mosaic account of the creation as, beyond comparison, the most perfect and beautiful example of analysis that is to be found within the whole compass of literature. In fine, that this word, day, should have a different meaning in other connections, where it occurs without any such precise definition, as "In the day that the Lord God made the earth and the heavens," is in strict accordance with all the laws and usages of language. But to impose such a meaning upon it in disregard of its connection, and in the face of such a definition as is here given it, is a violation not only of the nature of language, but

also of the immutable laws of analytic thinking, such as tends to unsettle and confound all received principles of interpretation, and of thought itself.

These are some of the objections which lie against this method of harmonizing the Mosaic cosmogony with modern science. Is it not evident that it imposes on the words a meaning which they were not intended to bear, imperils some of the most important of revealed truths, and otherwise introduces far greater difficulties than those which it claims to remove? And who can foresee where this procedure may ultimately lead us? For it is not physical science alone with which we have to do. Anthropology, biology, and psychology, to say nothing of historical criticism, are now putting in their claims to govern our interpretations of the word of God—sciences which have a direct bearing upon its moral and spiritual import. And when, for precisely similar reasons, we come to impose upon it every meaning which the sceptical tendency of these sciences may seem to require, what is likely to become of the doctrines of the fall of man, the incarnation, and redemption by the sacrifice of Christ?

But, on the other hand, nothing which can possibly be claimed as of any moral or spiritual import, in the cosmogony or any other part of the Bible, is in the least affected by the principle of interpretation for which I here contend. No such claim can be made for the length of time during which the work of creation was going on, nor for the order in which it took place, nor for any other forms or details in which it is narrated, provided God be understood to have created all things that exist. For evidently this was the grand truth which Moses aimed to set forth in his catalogue of particulars. And in these he speaks of the physical world as it is spoken of everywhere else in the Bible, that is to say, in free and popular language, in accordance with the impressions which it makes upon the senses, or with the conceptions of it which prevailed in his time, and which, no doubt, he shared with his contemporaries. All these details and particulars, therefore, are to be taken as the material and human framework, so to speak, of the sublime picture, in which it is here revealed to our faith that there is

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but one only living and true God; that he is a free personal Being of infinite wisdom, power, and goodness; that he created all things by the word of his power, especially man, male and female, in his own image or likeness—and whatever else there may be in these particulars which is of any moral or spiritual significance. It would seem that these great truths are enough for one short chapter in the Bible; for they lie at the foundation of all true religion, in direct contradiction to atheism, materialism, pantheism, dualism, polytheism, fetishism, and idolatry—those deadly errors which have always dominated over the human mind wherever they have not been driven out by the revelation of himself which God has given to mankind in his Word.

In conclusion, by the adoption and consistent application of this principle of interpretation the malignant enemies of true religion—that seed of the serpent, who are permitted to bruise the heel of the seed of the woman, whilst he crushes their heads—would be deprived of their deadliest fangs. For, although they should find in the Holy Scriptures innumerable allusions and statements, with respect to natural objects, which are not in accordance with the scientific truths which underlie the phenomena, what would it all amount to more than is contained in the words, The sun rises and sets? Also, science truly so called would thus be left free to prosecute her own great and blessed work, unimpeded by fear or misgiving lest her ever-multiplying discoveries might come into conflict with the truths of revelation. Besides, as many of her votaries as are at all sensible of their spiritual wants—who are as numerous, no doubt, as they are among other people—would be delivered from their peculiar difficulties and temptations to scepticism, and would find in Christian faith that peace and joy which the Gospel brings to the heart of every true believer. And the aid which they would then bring to the defence of the Scriptures—who can estimate how great and effectual it would be? Moreover, the learned interpreters of the word of God would be forever emancipated from that sore temptation with which they are now beset to impose upon it meanings which it was never intended to bear, and which without abuse it cannot be made to bear, in or-

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der to harmonize it with science—a procedure which greatly injures the conscience and mightily confounds the principles of hermeneutics. But what is, perhaps, of greater importance than all other advantages is that these "oppositions of science" would no longer dwarf and well-nigh paralyze the faith nor mar the peace of God's dear children, as, in a multitude of cases, they now do. Delivered from this incubus, the faith of the church might be expected to grow up to "the measure of the stature of the fulness of Christ," and go forth again to conquer the world.

ENGLISH PHILOSOPHY.

[A Paper read before the American Institute of Christian Philosophy, 1st December, 1881.]

By Rev. J. W. Mendenhall, PH.D.

WHAT is English philosophy? Technically, is there any such thing? By this introductory question we do not intimate that there is in England no spirit of philosophic inquiry, and especially that there are no philosophic minds among that great people. On the contrary, it is admitted that the attitude of philosophy across the Atlantic is such as to command attention, and the popular idea is that England is the centre of modern philosophic thought; and that, like the Alps, which, according to Professor Draper, affect the meteorology of Europe, it towers above everything, even religion, and is moulding the philosophy of the age and touching the mainsprings of civil, domestic, social, and religious life. We cannot, however, allow that its altitude is so great, or its position is so conspicuous, or its influence so far-reaching as a writer in the December number (1880) of the *International Review* represents in an article full of prejudice and which is one-sided in its statements and conclusions. In that article London is pictured as a modern Athens, and Spencer, Bain, Darwin, Huxley, and others, as the greater Platos and Aristotles. "Philosophy has had its new birth, and has established its new capital," says the writer, in the midst of the great commercial city of Britain, and "from the north to the south, over the length and breadth of the land, the science of sciences has shed its light and shown the way to make life better worth living."

From this the reader infers that the old Grecian love of

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speculative pursuits has returned to the children of men, that Bain and Spencer have resumed studies not completed by Plato and Aristotle, and have carried on their investigations to a final and satisfactory development, creating at last a true philosophy, homogeneous, strong, well-seasoned, and that which will be universally accepted. If there is a prominent fault among the thinkers of England, it is this of outspoken egotism, an assumption that their work, though almost wholly negative, is as final as demonstration or revelation itself. The assumption of the finality of English philosophy is grounded in the belief that that philosophy is complete, full developed, and solves all questions; that there is a unity among the thinkers; and that, though there may be different schools, they see eye to eye, and are advocates in the last analysis of one system. In this the mistake is all but apparent, for the fact is, though the public understanding may be different, there is *no school of philosophy in England.* English thinkers are independent in their movements; there is no cohesion, no bond of union among them. Each one is the framer of a special or individual system, the advocate of a doctrine *sui generis*, regardless of its connections or relations with the systems of others. At Oxford there is a "coterie of Hegelians;" in London there are all classes, evolutionists and non-evolutionists, Spencerians and anti-Spencerians, biologists, sociologists, materialists, Christian thinkers, all; and it is confessed by the writer above alluded to that "each thinker moves in his own orbit," and that British philosophers are noted for their individuality. Is there any phase of thought, any form of philosophy, concerning which there is any uniformity of opinion in England? Do they agree on any system? Herbert Spencer is quoted in the *Review* as saying that there is "no common mark entitling the present and recent English philosophers to be classed together as constituting a school, unless it might be their general acceptance of the doctrine of evolution." Why Spencer should claim general unanimity among British scholars touching evolution, in the face of the well-known fact that many disown the doctrine, is an instance of blindness to actual facts not unusual among the "broad-browed" thinkers of this generation. At all events it is evident from the statement of Spencer that there is no school of philosophy in England.

Nor is there any *national philosophy* in England in the proper sense of the words. What there is is fragmentary, a medley of philosophic utterances, without combination, without adjustment to a system. We have, it is true, psychology from Alexander Bain, biology from Huxley, sociology from Spencer, evolution from Darwin—fragments of systems, but no union, no system, no national philosophy. Professor Morris, of the Johns Hopkins University, in addition to declaring that the record of the English in philosophy is not a "shining one," affirms also that religion and science occupy the theoretical interests of the English mind, while philosophy is their common "waste-basket." From the days of Lord Bacon the English have manifested a fondness for scientific pursuits, and little relish for legitimate philosophical questions. Philosophic insight is not native to the English mind. It is scientific, even religious, but not philosophic. Did not Sir William Hamilton upbraid the English mind with an utter inability to appreciate philosophy, and that it preferred to discuss the lower problems of utility and scientific law? Less than twenty years ago, that living British thinker, George Henry Lewes, asked this question: "Is it not a justifiable hope that, by applying the method of science to *all* questions, England may some day possess a philosophy, the absence of which during the last two hundred years has been a serious defect in her culture?" From these opinions and a study of the intellectual character and drift of thought in England, it is true to affirm that, as she has no school of philosophy, England has no national philosophy. Yet the *Review* writer compares London to Athens, and the British philosophers are raised above the academicians and peripatetics of twenty-five hundred years ago.

Not less surprising is the attempt of that writer to formulate the results of English philosophy. It is not in us to disparage the labors or ridicule the achievements of the great minds of England, for however fragmentary is that philosophy, it is the expression of research, of great labor, and its results are not to be despised. All we ask is that too much is not claimed for it. It has not done everything, nor are its discoveries the last discoveries, or its utterances the last utterances of philosophy. That the doctrine of evolution is the product of nineteenth-cen-

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tury philosophy may be granted, provided the atomic theory of Democritus, which, though not evolutionary exactly, is suggestive of it, be forgotten. We mean to say that among Hellenic theories of the world's origin and growth there were adumbrations of modern philosophic theories, which, as developed, pass for original discoveries or conceptions. Evolution is not entirely new, yet modern philosophy exalts it as its own discovery. Even allowing what Mr. Spencer claims, that it alone distinguishes modern philosophy, it must be remembered that many scholars do not accept it, and that it is undergoing modifications at the hands of such men as Mivart and Dr. Beale.

The writer in the *Review* claims for English philosophy the honor of first announcing the law of Universal Relativity. "The law of evolution is a law of expansion and growth; the law of relativity is one of restriction and limitation, *defining the field of knowledge*." Yes; English philosophy has reduced the field of knowledge to within very small limits, and has loaded the human faculties with imbecility and opprobrium, for which, perhaps, it deserves our thanks. Hume, though a Scotchman, blotted out the mind; Locke said it was a *tabula rasa*, came into the world empty, was like a blank piece of white paper; Sir William Hamilton laid down the law of relativity, and, declaring the absolute to be aloof from relation, concluded He was unknowable; Spencer succeeds and concludes the infinite *unthinkable*. This is the outcome of the law of relativity in the hands of the English philosophers; a wonderful result, truly. So, again, "we must place to the credit of English philosophy a law of proof upon which the whole science of logic stands." The law is that truth must be in harmony with other truths, or must be in harmony with the laws of nature. Mill, Bain, and Spencer are eulogized as advocating this law. In general, truths harmonize, the natural with the natural, the spiritual with the spiritual; but the law of proof is intended to compel a congruity between the natural and the spiritual, or the spiritual must subside. Everything must be tested by natural law: mental action, spiritual experience, revealed truth. Nature is the test of truth. This, not Plato, or even Zeno, the Stoic, would have granted; but it is left to English philosophy to declare this test as the only valid and rational test of all truth.

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In consenting that the law of consistency, which involves the laws of contradiction and excluded middle, was originally wrought out by the Greeks, the *Review* writer calls attention to the discrepancy in the methods of reasoning adopted by Plato and Aristotle, and affirms that English philosophy has at last effected a final mediation between them. Plato believed that knowledge originated in absolute ideals; Aristotle, in experience. English philosophy has, according to this writer, mediated in favor of Aristotle, and experience henceforth will be philosophically the only source of knowledge. This is nothing but sensationalism, old at least as Aristotle, and tending, as it did in the hands of Hobbes and Condillac, to the worst forms of materialism.

The experience-philosophy, like the law of relativity, in its best aspect, conducts us, as Professor Bowne has ably shown in his "Review of Herbert Spencer," to nihilism. Of what, then, besides nihilism, materialism, an unthinkable and unknowable God, has English philosophy to boast? Beginning in its course of supremacy, as the writer says, with Jeremy Bentham, who was a utilitarian, and the teacher of James Mill, it has developed into the nihilism of Spencer, and has pronounced God and religion as "*pseudo*-ideas," unworthy of attention.

To be sure, in its scientific departments it has discovered facts which are invaluable, though the religious tendency of all is to materialism. Professor Bain has given the world a new psychology, quite as materialistic as Spencer could wish. Biology is, indeed, the product of living English philosophers, but Dr. Beale tripped Huxley before he was fairly on his feet. "Sociology was formless before Spencer wrote." Out of these scientific ventures have come systems of morality, in particular that of Spencer, which, in substance, is that there must be an adjustment of the inner and outer relations, and if one succeeds in realizing such adjustment his conduct will be perfect. This is the *ethics* of English philosophy. Religion, too, intimates the writer, has been profoundly affected by the undermining processes of philosophy, and, in fact, it has revolutionized everything. It can be truly said that it has laid its hands upon everything, as Lucifer did upon the throne, and has dared to go "where angels feared to tread;" it has assailed religion, the

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soul, the Bible—calling it a "Hebrew myth"—the destiny of man, and God himself. It is a positive philosophy in its assailing energies; it is pure negativism, aye, nihilism, in its last results.

What a pity that writers of magazines cannot rise above the prejudices of the times, and give an impartial account of what philosophy is doing! Athenian philosophy is preferable to London philosophy; Plato surpasses Spencer; Socrates will outlive Huxley; and, though Aristotle was almost a backslider, he, too, is a safer guide than the coterie of *pseudo*-philosophers who pretend that the world was organized out of mist, and who believe that man's destiny is simply in the line of evolution, and that God is still x, or the unknown in the universe.

THE EGO IN CONSCIOUSNESS.

[Synopsis of a Paper read before the American Institute of Christian Philosophy, 23d February, 1882.]

By Llewelyn D. Bevan, D.D.

IN the argument which we propose to pursue there are certain preliminary considerations of an axiomatic character which it is needful to remember. In the first place, we maintain the absolute and final authority of consciousness in the determination of all metaphysical questions. A fact of consciousness clearly apprehended cannot be gainsaid; to doubt it will be not only to make science impossible, but to destroy the doubt itself. Scepticism like dogmatism must finally appeal to consciousness; and to doubt that we doubt is no less the suicide of the former than to doubt that we know is the destruction of the latter.

Even revelation itself must be subjected to the same canon. We cannot know that anything is revealed unless we are able to trust in the trustworthiness of consciousness. Revelation may therefore supply us with what reason could never discover, but it can never give us anything which contradicts a final and absolute fact in our consciousness. Universality and necessity are the tests of facts of consciousness, although language, general consent, common-sense may be appealed to as aids in the determination of what shall be considered as consciousness. Universality and necessity are the qualities of what is termed the *a priori* principle of thought. Hence these must be finally reduced to facts of consciousness as the prime data and axioms of all scientific philosophizing.

We may here insert a single caveat. Facts of consciousness

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are not to be limited, as by the sensational school, only to what is given in sensation and the subsequent operation of the mind upon that which the senses supply. The principle of that school, *nihil in intellectu quod non prius in sensu*, has been well completed by the clause *nisi intellectus ipse*. And it is this which the sensationalists have forgotten. That while the senses give the material of thought, the subject of thought has its own nature. The intellect may be, indeed, a blank sheet, to be written upon by any ink in any characters. Nevertheless the very substance and tissue of the paper will modify those letters and give them a certain character, and perhaps even wholly change the quality of the ink. The fact of consciousness, then, must include what the external world of sense supplies with its law, and what the internal world of reason furnishes with its law, not a whit the less impressive and necessary.

Our first principle, then, is the pollency of consciousness, but consciousness understood in no narrow sense.

The second axiom which we require, is that in the consideration of the source of any quality which is manifested by a complex condition of consciousness, if one of the members of the complex group can be shown to furnish the quality under consideration it is not necessary to affirm the quality of the other members, and it may be possible to affirm the absence of such quality. This, in other words, is the law of economy.

A third principle may be here indicated which is really a corollary of the former. When two members of a group of facts are submitted to change, and if it be found that one member is invariable, then such change as belongs to the group shall be referred to that member other than the invariable member.

Let us in the first place consider what is given us in sensation. We perceive an object—the book before me. I see it; I feel it; I run my hand along its edges; I lift it. All these and other effects upon my senses I combine, and in that I perceive the book. What are the elements, then, of this perception?

(1) The sensations.

(2) The combination of these in one object.

(3) Combination of these with the perceiving subject.

(4) The perceiving subject itself.

Or, more briefly, the state of consciousness is

The Ego, perceiving.

Something, not the Ego, perceived.

The combination of these in one state of consciousness.

Without pursuing the analysis through the steps with which you are all familiar, we at length conclude that the law or form of space which is affirmed to be necessary and universal in all perceptions of the external world is given to us in the fact of consciousnes which consists of the aforesaid elements. Now arises the question, To which of the elements is the law of space to be referred? Is it to be referred to all? If not, then to which of the three; or if to three, to which is it not to be referred?

Let us now change the fact given in consciousness. Let other objects present themselves. In every case the law of space will be found present as a form in which the object is perceived, but in each case varying—varying with the varying object; varying as the object varies. The combination of the Ego and the non-Ego will of course vary also with the variation of the non-Ego, and the only stable, invariable, independent, changeless factor is the Ego itself. The presumption, then, is at least possible that the form of space is not referable to the Ego itself, but only to the object perceived by the Ego, or to the combination of the Ego and the non-Ego in perception.

Let me next remind you of the fact of consciousness given in thought. Suppose that the senses are no longer affected by the book, but the mind having extracted the qualities of the book given in sensation, recalls them by a pure act of intellect, forms the idea of the book; in a word, thinks the book. Now here, as you are all familiar, will come in the law or form of time which is the succession of ideas. And once more we may analyze the fact of consciousness into

The Ego, thinking.

The non-Ego, thought.

The combination of the Ego and the non-Ego into one state.

Here, again, let changes take place. Let one thought succeed to another. Each begins, each ends; but this succession,

the beginning, the ending which is the necessary, formal law of time, is referable solely to the non-Ego or the combination of the non-Ego and the Ego. The Ego has remained unchanged; it has not begun, it has not ended. It has been the stable, the permanent, the changeless possibility or condition of thought. Hence again we conclude that the presumption is that the Ego is not related to time or succession, which belongs, as we have seen, wholly to the non-Ego and the combination of the non-Ego with the Ego.

This presumption in either case is made absolute when we combine these two classes of consciousness and compare them.

Take the state of consciousness in sensation. Let it then change to that of thought. Let perception yield to conception, the object felt to the idea imagined. Do this rigorously, and in each case the form or law necessary for the special case ceases and yields to the other form or law. Space gives way to time, time to space. We feel in the one, we think in the other. The object, the non-Ego, has changed, but the Ego remains unchanged. Hence if the law were a necessary law of the Ego in itself purely and alone, it must be found in both conditions. We find it, however, only in its specific case, and conclude, therefore, that the Ego is independent both of space and time; that it is thinkable only out of space and time; that nothing can be affirmed of it but being, and the possibility of combination with non-Ego in consciousness. In other words, the Ego *per se* is absolute and independent.

To this brief and necessarily abstract analysis I add one answer to an objection and one illustrative confirmation. The latter, I believe, has never been noticed, at least I am unaware of the fact. But of its force I must leave you in after-thought carefully to judge.

The objection is this, that we cannot think of the Ego except in relation to time. That even if it be out of relation to space, it is yet as an object of thought as much controlled by the form of time as any object of thought. This is true, but it must be noted that the Ego is then no longer the subject of thought, but its object; and in the thinking of the Ego the state of consciousness which we have is:

(1) The Ego the subject of thought.

(2) The Ego the object of thought, and therefore in this case become the non-Ego.

(3) The combination of the subject and object.

It is true that the Ego when it is thus thought, when it becomes the object of thought, is related to time and must be. But as the thinking subject, you will observe, it here escapes the law as much as in any other case, and remains the independent and absolute entity, the mere substance of thought and consciousness, the only attributes of which are being and possibility of combination in a state of consciousness with that which is not itself. In other words, the Ego *per se* is unthinkable. But we are dealing not with the thinkable, but with the actual, the ontological; and that anything should be unthinkable is no reason for its non-existence.

(This has been clearly apprehended and fully used by Prof. Ferrier in his "Institutes of Metaphysics.")

The illustrative confirmation of the position which I take is the following: When we think of another person we always think of the personality as it has been revealed to us in bodily form, and we generally if not universally recall another by the imagination of the bodily shape with which we are familiar. When we think of ourselves, however, we never think of our bodies. Thus we think of others in space, but we do not think of ourselves in space. I merely mention this briefly as an illustration of the argument in respect of space as the answer to the objection before noted is the confirmation of the argument in respect of time.

It would be interesting to pursue this subject still further in regard to *causation.* This may furnish a topic of discussion on another occasion. Time, if of no metaphysical account, is practically of some importance.

The practical application of this subject is of great importance in one direction. I was led to the analysis by a discussion of a very different character. In dealing with the question which promises to be of large importance in the Church in the near future, viz., the destination of the impenitent and the future continuance of man, I have always used as an argument against the doctrine of annihilation the impossibility of the destruction of

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the spirit, from the impossibility of the cessation of its being. We may change consciousness, but we cannot destroy it. The cessation of a state of consciousness is only the beginning of another state; and for a being to cease to be, it must cease to be conscious. And the answer has always been made—If it be unthinkable that a spirit should cease to be, it is equally unthinkable that it should begin to be. In other words, the creation of the spirit is thus denied as well as the annihilation of the spirit. I felt the force of the argument, but I saw at last that it applies only to the object of thought and not to the subject, not to the Ego. In other words, the Ego is out of relation to time and space altogether. We cannot affirm that the Ego *per se* has begun or ended. We only can affirm that it is. The question, then, of the existence of the Ego *always* is irrelevant. If by eternal we mean an infinite succession of finite times, we answer that this may be affirmed of consciousness but not of the Ego, which is unrelated to time. But if by eternal, as more properly we should use it, we mean independence of time (and this is the sense in which it is affirmed of God), then we can say that the Ego is eternal, and therefore its annihilation is unthinkable, as its creation is unthinkable. It shares the Divine nature, as we are told by Scripture that the physical organization of man was imbreathed by the Spirit of God, and is thus eternal after the likeness of God himself.

This we think we have proved philosophically as well as we receive it by the authority of the word of God. Our answer, then, to the annihilationist is the following: We cannot think of the extinction of consciousness. And if you reply that then we cannot think of the beginning of consciousness, we rejoin that it begins by the transference of the consciousness of God to the organism of the creature. And this is confirmed by the ontological conclusion of our argument, combined with the declaration of the divine word. The philosophical truth makes the possibility of the understanding of the divine word.

Some of the other practical aspects of the discussion I must leave, such as the relation of the human being to the moral law. Perhaps they may be more easily considered after the discussion of causation in a similar way.

HISTORICAL.

1881.

THE Victoria Institute is an organization which has for its object the creation and distribution of literature illustrating the relations between science and religion. Many of its members are in Canada and the United States, and many of its ablest papers are produced on this side the Atlantic. It was very natural that in the course of time it should occur to American Christians and scholars that it would be well to attempt the formation of a similar institution in this country.

Whether there would be found enough interest to give this movement such a beginning as would attract the attention of those who should be interested in such an undertaking, and who could give it the aid necessary to make it practically useful, could not be determined until some one risked a commencement. The Rev. Dr. Deems, the pastor of the Church of the Strangers in New York, who had for years been a member of the British Institute, and the Rev. Amory H. Bradford, pastor of the Congregational Church in Montclair, made an effort to ascertain whether there could be found ten gentlemen who would deliver a course of lectures all in the line of the relations of science to religion. They had the pleasure of discovering not only that the scheme was practicable, but that many gentlemen distinguished for their learning, and held in high repute throughout the country on account of their exalted character, were in sympathy with the movement, although they could not take part in the first course. A syllabus having been made, a hearty coadjutor was found in William O. McDowell, Esq., who owned a beautiful property called Warwick Woodlands, situated on the west side of Greenwood Lake, a beautiful body of water lying nearly equally in New Jersey and New York, at the terminus of a rail-

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way forty-two miles in length from New York City. This gentleman engaged to build a Hall which should be used for the Lectures, and by his energy secured an Encampment Hotel, the rooms of which consisted of tents. He showed the additional munificence of paying the fees and expenses of the lecturers. According to announcement the course was opened on the morning of July 12, with the reading of a portion of the Holy Scriptures and with prayer by Charles F. Deems, D.D., LL.D., who had permitted himself to be announced as Dean of the School, and who presided over all its exercises. Dr. Deems then delivered a lecture on *The Cry of "Conflict."* On Wednesday, 13th July, the opening worship was conducted by Rev. W. B. Palmore, of Mo., and a lecture delivered by President Porter of Yale College: the subject, *What we mean by Christian Philosophy.* On Thursday, 14th July, the opening worship was conducted by Rev. George A. Gates, of Montclair, and a lecture delivered by Prof. Borden P. Bowne, of Boston University: the subject, *Some Difficulties of Modern Materialism.* On Friday, 15th July, the opening worship was led by Rev. Prof. Sawyer. The Rev. Thomas Guard, of Baltimore, had been announced, but the state of the health of that gentleman kept him from the School, and his place was supplied by Prof. Stephen Alexander, of Princeton, whose lecture was on the *Origin and Primitive State of Man.* On Saturday, 16th July, the public worship was conducted by Rev. Addison K. Strong, D.D., of Hoboken, and the lecture delivered by Prof. C. A. Young, of Princeton, on *Astronomical Facts for Philosophical Thinkers.* A number of persons remained in the Encampment Hotel, and many visitors were at the other hotels around the lake, drawn thither by the great beauty of Lake Greenwood and its vicinity. The published syllabus provided a sermon for Sunday, and no discourse collected a larger congregation than that which attended the sermon, which was delivered by the Rev. Amory H. Bradford, A.M., of Montclair, N. J., who had acted as Secretary of the Summer School from its inception. Mr. Bradford's subject was *Conditions of Spiritual Sight.* The text was Matt. v. 8: "Blessed are the pure in heart, for they shall see God." Monday, 18th July, the public worship was conducted by Rev. W. C. Stiles, of Brooklyn, and the lec-

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ture delivered by Prof. Alexander Winchell, of the University of Michigan: the subject, *The Philosophical Consequences of Evolution.* Tuesday, 19th July, the public worship was conducted by Rev. Dr. Taylor, of Newark, N. J., and the lecture delivered by the Rev. Lyman Abbott, D.D., of New York City: the subject, *Foundations of Christian Belief.* Wednesday, 20th July, the public worship was conducted by Rev. Dr. E. O. Flagg, of Newark, N. J., and the lecture delivered by the Rev. J. H. McIlvaine, D.D., of Newark, N. J.: the subject, *Science and Revelation.* Thursday, 21st July, the public worship was conducted by the Rev. Dr. Bacon, of Toledo, O., and the lecture delivered by Prof. B. N. Martin, of the University of New York: the subject, *Recent Physical Theories, in their Bearing on Teleology.* Friday, 22d July, the public worship was conducted by the Rev. Dr. Craven, of Newark, N. J., and the lecture delivered by President John Bascom, of the University of Wisconsin: the subject, *The Gains and Losses of Faith from Science.*

From the beginning to the close of the course of lectures there was an increase of attendance and interest.

On the 21st of July, 1881, in the Hall of Philosophy at Warwick Woodlands, Greenwood Lake, N. Y., a meeting was held on call for the purpose of organizing the American Institute of Christian Philosophy. The Rev. J. H. McIlvaine, D.D., of Newark, N. J., presided, and Rev. A. H. Bradford, of Montclair, N. J., was elected Secretary. The following paper was adopted and published as the prospectus of the American Institute of Christian Philosophy.

OBJECTS.

This Society has been founded for the purpose of promoting the following Objects of high importance to both Religion and Science:

First. To investigate fully and impartially the most important questions of Philosophy and Science, but more especially those that bear upon the great truths revealed in Holy Scripture, with the view of demonstrating the harmony between true Christianity and true Science.

Second. To associate MEN OF SCIENCE and AUTHORS who have already been engaged in such investigations, and all others who may be interested in them, in order to strengthen their efforts by association, and by bringing together the results of such labors, after full discussion, in the printed

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Transactions of an Institution; to give greater force and influence to proofs and arguments which might be little known, or even disregarded, if put forward merely by individuals.

Third. To consider the mutual bearings of the various scientific conclusions arrived at in the several distinct branches into which science is now divided, in order to get rid of contradictions and conflicting hypotheses, and thus promote the real advancement of true Science; and to examine and discuss all supposed scientific results with reference to final causes, and the more comprehensive and fundamental principles of Philosophy proper, based upon faith in the existence of one Eternal God, the Creator of all things.

Fourth. To publish Papers read before the Society in furtherance of the above objects, along with full reports of the discussions thereon, in the form of a Journal, or as the Transactions of the Institute, or in a Quarterly Review of Christian Science.

Fifth. When subjects have been fully discussed, to make the results known by means of Lectures of a more popular kind, and to publish such Lectures.

Sixth. To publish English translations of important foreign works of real scientific and philosophical value, especially those bearing upon the relation between the Scriptures and Science; and to co-operate with other philosophical societies at home and abroad, which are now or may hereafter be formed, in the interest of Scriptural truth and of real Science, and generally in furtherance of the objects of this Society.

Seventh. To found a Library and Reading Room for the use of the Members of the Institute, combining the principal advantages of a Literary Club.

MEMBERSHIP AND SUBSCRIPTION.

The Annual Subscription for MEMBERS is Ten Dollars. The Annual Subscription for Associates is Five Dollars. One Hundred Dollars will constitute a Life Member, and Fifty Dollars a Life Associate.

Members are entitled to a free copy, by mail, of each number of the Official Publication which contains the papers read before the Institute; also to a free ticket to every course of Lectures delivered under the auspices of the Institute; also to a free use of the Institute's Library.

Rev. Charles F. Deems, D.D., LL.D., was elected Provisional President; Rev. Amory H. Bradford, Provisional Secretary; William O. McDowell, Provisional Treasurer; and those gentlemen were empowered to do all that may be necessary, in their judgment, to promote the objects of the Institute until the Institute should be incorporated and by-laws should be adopted.

The first monthly meeting was held at Warwick Woodlands,

on the 28th of August. It was then ordered that all sums coming to the Institute by legacy or gift be invested by the officers as a permanent endowment fund, unless otherwise directed by the devisers or donors. The following gentlemen were elected Vice-Presidents, viz.: John Bascom, LL.D., of Wisconsin; Hon. Kemp P. Battle, LL.D., of North Carolina; Rev. Bishop Charles Edward Cheney, of Illinois; and Gen. G. W. Custis Lee, of Virginia. It was ordered that the annual membership run for one year following the first of the month next after the date of the payment of the fee. The officers of the Church of the Strangers having offered to the Institute the free use of their parlors for the office and the meetings of the Institute, the generous offer was accepted, and it was ordered that the monthly meeting of the Institute shall be held in those parlors (4 Winthrop Place, Greene Street, near Waverley Place, New York) on the last Thursday of every month, at 7.30 P.M., unless otherwise ordered.

The second monthly meeting was held on the 29th of September, 1881, in the rooms of the Institute, 4 Winthrop Place, New York, the Rev. Dr. Deems presiding. Rev. Edward M. Deems, pastor of the Westminster Church, N. Y., conducted the religious services. A form of certificate of membership was adopted, and a committee was appointed to report to the next monthly meeting a system of by-laws.

The third monthly meeting, being the first quarterly meeting, was held in the rooms of the Institute, the President presiding. A portion of the Holy Scripture was read and prayer was offered by Marshall B. Smith, D.D., of Passaic, N. J. The Committee on By-Laws reported the following paper, which was unanimously adopted:

By-Laws of the American Institute of Christian Philosophy.

ARTICLE I.

NAME.

This Society shall be known as The American Institute of Christian Philosophy, and its Constitution shall be the act of incorporation, together with the prospectus setting forth objects, etc., adopted July 21, 1881.

ARTICLE II.

MEETINGS.

SEC. 1. The Institute shall hold regular monthly meetings on the last Thursday evening of every month, at 7.30 o'clock, except when otherwise ordered.

SEC. 2. The President shall preside at all the meetings, or in his absence, or at his call, some Vice-President; and in the absence of President and Vice-Presidents, the members of the Institute shall select from among themselves a President *pro tempore*.

SEC. 3. The following shall be the order of proceeding at the monthly meeting:

1. Reading Holy Scripture and Prayer.
2. Reading the Minutes of the latest preceding Meeting.
3. Election of Members.
4. Election of Officers, if any vacancies exist.
5. Report of the Standing Committees.
6. Report of the Special Committees.
7. New Business.
8. Announcements.
9. Reading of the Paper appointed for the Evening.

SEC. 4. Upon the arrival of the hour appointed for any paper which has been announced, its reading shall take place, and the unfinished items of business shall follow the reading.

ARTICLE III.

OFFICERS.

SEC. 1. The Officers shall be a President, a Vice-President for every State in which there are members, a Secretary, and a Treasurer.

SEC. 2. The Officers shall be elected by the members from among the members.

SEC. 3. The election of Officers shall be by ballot, and shall take place annually at a time to be hereafter fixed by the Institute.

SEC. 4. Gentlemen not residents of the United States may be chosen Honorary Vice-Presidents by the Institute.

ARTICLE IV.

DUTIES OF OFFICERS.

The duties of the Officers shall be such as ordinarily pertain to the offices of President, Vice-President, Secretary, and Treasurer. The Treasurer shall render a statement at each monthly meeting of the sum of the

amounts received and the sum of the amounts expended. He shall also present a written report quarterly at the meetings held in March, June, September, and December of each year, giving the items of expenditure. The reports of the Treasurer shall be audited by the Committee on Finance.

ARTICLE V.

STANDING COMMITTEES.

SEC. 1. There shall be five Standing Committees, viz.: on Membership, on Finance, on Papers, on Lecturers, and on Publication.

Each Committee shall consist of five members, to be appointed by the President from among the members and associate members.

SEC. 2. *Committee on Membership.*—It shall be the duty of this Committee to secure members for the Institute, and to examine and report upon any questions which may arise touching membership.

SEC. 3. *Finance Committee.*—The duty of the Committee on Finance shall be to devise ways and means to carry out the objects of the Institute, and to make the permanent investments ordered by the Institute.

SEC. 4. *Committee on Papers.*—It shall be the duty of the Committee on Papers to secure articles to be read at the monthly meetings of the Institute, and to determine upon the fitness of such as shall be voluntarily offered, and to pass to the Committee on Publication all papers that have been read before the Institute.

SEC. 5. *Committee on Lecturers.*—It shall be the duty of this Committee to procure gentlemen to deliver lectures at the quarterly meetings and in any courses that may be determined upon by the Institute.

SEC. 6. *Committee on Publication.*—It shall be the duty of this Committee to examine the papers and lectures and report to the Institute such as they think should be published, and to supervise the publication of papers ordered by the Institute.

ARTICLE VI.

CHANGES IN THE BY-LAWS.

Any one of these By-Laws may be rescinded or amended by a vote of two thirds of the members of the Institute assembled under notice to act upon the proposed change.

A paper was then read by Edward C. Mann, M.D., of New York, on *Errors of Materialistic Physiology.* It was discussed by Rev. Wesley R. Davis, Marshall B. Smith, D.D., Gen. O. O. Howard, Rev. A. H. Bradford, and the President, and was ordered to the Committee on Publication.

The following gentlemen, who had become members of the

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Institute, were elected Vice-Presidents, namely: James McCosh, D.D., LL.D., for New Jersey, and the Rev. Bishop McTyeire, for Tennessee.

It was determined to issue a quarterly publication to be the organ of the Institute; and Rev. Dr. Deems, Gen. O. O. Howard, and Charles M. Davis, Esq., were appointed to bring out the first number, in which it was directed that the publication of the lectures before the Summer School of Philosophy be begun.

The fourth monthly meeting was held in the rooms of the Institute, December 1, 1881; Rev. Dr. Deems presiding. A lesson was read from the Holy Scripture and prayer was offered by George Washburne, D.D., President of Robert College, Constantinople. President Porter, of Yale College, and Bishop Hurst, of Des Moines, Iowa, were elected Vice-Presidents. A paper on "English Philosophy," prepared by Rev. J. W. Mendenhall, Ph.D., of Ohio, was read by Rev. George E. Strobridge, of New York. It was discussed by gentlemen present and ordered to the Committee on Publication. Mr. William O. McDowell presented the Act incorporating the Institute with the following trustees, viz.: Charles F. Deems, Howard Crosby, A. H. Bradford, Cornelius Vanderbilt and William O. McDowell.

The fifth monthly meeting was held in the rooms of the Institute, Dec. 29, 1881, Rev. Dr. Deems presiding. A lesson was read from Holy Scriptures, and prayer offered by Rev. W. H. Barnes, Rector of the Church of the Atonement, Brooklyn, N. Y. The great inclemency of the weather having detained many, the reading of the paper prepared for the occasion was postponed.

1882.

THE Monthly Meeting for January was held on the 26th of the month, at the Rooms. The President was in the chair. Holy Scripture was read and prayer offered by Rev. A. H. Bradford. The following gentlemen were elected Vice-Presidents, viz.: Francis L. Patton, D.D., LL.D., for New Jersey, and Mark Hopkins, D.D., LL.D., for Massachusetts. The following amendment to the Prospectus was adopted: After

the "Seventh" statement of "Objects," add "*Eighth:* To interest Christian men and women, *learned and unlearned*, in the production, the circulation, and the reading of a literature which shall promote intellectual and religious culture." A paper written by President John Bascom, of the University of Wisconsin, was then read and discussed; the subject, "*The Freedom of the Will empirically considered.*"

The Monthly Meeting for February was held on the 23d of the month. In the absence of the President and Vice-Presidents, Rev. Edward M. Deems was elected President *pro tem.* Religious services were conducted by Rev. A. K. Strong. The following gentlemen were elected Vice-Presidents: P. H. Mell, D.D., LL.D., the Chancellor of the University of Georgia, for Georgia, and William A. Scott, D.D., LL.D., for California. A paper was read by Rev. L. D. Bevan, D.D., on "*The Unconditioned Ego*," and was discussed at large.

The Monthly Meeting for March was held on the 30th of the month, the President in the chair. Thirty-two new members were added to the roll. Religious services were conducted by Rev. Dr. Watkins, Rector of the Church of the Holy Trinity, New York. The following gentlemen were elected Vice-Presidents: William H. Allen, LL.D., President of Girard College, for Pennsylvania; Roswell D. Hitchcock, D.D., LL.D., President of the Union Theological Seminary, for New York; and the Rt. Hon. the Earl of Shaftesbury for England. A paper by the Rev. S. S. Martyn, on "*The Bible as a Final Authority of Religious Truth*," was read by Rev. Carlos Martyn, and discussed. It was ordered "that in the statement of the 'Objects' of the Institute, in the 'First' all words be omitted after the words 'Holy Scripture.'"

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NOTES FOR APRIL.

THE American Institute proposes to open its Summer School of Christian Philosophy at Greenwood Lake on the 11th of July, 1882. Vigorous measures are employed, and it is expected that the forthcoming session will greatly surpass in interest and value the session of 1881 because of better arrangements and the improvements which come from experience, and not because it is possible to have more able gentlemen in the Faculty. The Rev. Dr. Deems is to preside and to be aided by Rev. Mr. Bradford, the Secretary, and Mr. William O. McDowell, the Treasurer of the Institute. The following gentlemen are to constitute the Faculty, viz.: Lyman Abbott, D.D.; President Bascom, of the University of Wisconsin; Howard Crosby, D.D., LL.D., of New York; Prof. Davis, of the University of Virginia; Prof. Fisher and Prof. Ladd, of Yale College; Washington Gladden, D.D., of Springfield, Mass.; Rev. Dr. Mackenzie, of Cambridge, Mass.; Robert S. Moran, D.D., of New York; Prof. Francis L. Patton and Prof. Charles A. Young, of Princeton; and perhaps others. The gentlemen named have been engaged. In the July number of this Quarterly we shall be able to state the dates and subjects of the lectures, and to give all other needful information to those who desire to attend. Greenwood Lake is a very attractive summer resort apart from the Summer School, and we trust our friends will reserve the fortnight which begins with the 11th of July for a trip to the beautiful region.

SCIENCE AND HYPOTHESIS.—In the *Popular Science Monthly*, edited apparently in the interests of opposition to Christianity, Prof. Youmans asks the ridiculous question, "Why is science opposed?" The following is his extraordinary answer: "The-

ology withstood science because it was itself identified with the old erroneous explanations of nature. Philosophy made a stand against science because science circumscribed its field and subverted its ideals. Literature strove against science because of its devotion to fact and its supposed unfriendliness to imagination. Art resisted science as unfavorable to the inventive and creative spirit."

The following comment is made by the *Herald and Presbyter:* "The opposition of theology, philosophy, literature, and art is not to science, but to certain theories which a class of thinkers have called by that name. The controversy with materialism is not a controversy with science, though materialists seem determined that it shall be so considered. Real scientific investigation does not in this age meet with opposition from either philosophy or theology. It is, indeed, helped by them inasmuch as they insist on its separation from mere fancies and hypotheses. Neither is there opposition from literature or art. These cannot even be classed with the enemies of that materialism of which Prof. Youmans is an exponent. They certainly do not oppose it on the grounds he gives, viz., that it is 'unfriendly to imagination' and 'unfavorable to the inventive and creative spirit,' for writers and artists alike see that it is a model of imagination and creative spirit. The theory which invented Bathybyus and imagines missing links cannot be charged with unfriendliness to the creative spirit. The Professor has evidently looked into an optical instrument which inverts the object studied, for if there is any one ground upon which, more than another, theology, philosophy, literature, and art unite in objecting to the theory which he calls science, it is the opposite of that he gives. They are not troubled by its unfriendliness to imagination, but by its entirely imaginary and hypothetical character. If Prof. Youmans would write with the accuracy demanded by exact science, he must not confuse the buzzing in his own ears with a conflict of the elements, or the opposition to his pet theories with a war on science."

But this is asking too much of Prof. Youmans, whose training seems to have unfitted him, with all his commendable zeal and industry, for thinking with scientific accuracy. When he wrote "Theology has withstood science" he forgot that theology

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is itself a science, and that it would have been just as true to write that "Geology has withstood science," which would have reminded him that it was a conflict among the sciences which he had mistaken for an opposition to science in general. When he wrote "Philosophy made a stand against science" he seemed to have no conception of what philosophy is, or to have forgotten that the materials with which philosophy builds its structures it owes to science. The science of which Prof. Youmans seems to seek to make himself an apostle is not knowledge, but imagined "promises and potencies" of certain things in nature which have never yet fulfilled one of the "promises" so precious to the Professor nor excited one of the "potencies" so poetically ascribed to them.

THE *ad-hominem* argument is always pertinent if not convincing. But we hardly imagined that a converted heathen would use the authority of their own sacred oracles to persuade his countrymen of the truth of the doctrines of Christianity. And yet this is what Rev. Christine Mohun Banerjea, a Brahmin of the highest caste in India, has recently done. He was a pupil in Dr. Duff's school fifty years ago, and after his conversion aided greatly in procuring the edict of the government abolishing the cruel suttee. He has now delivered and published a lecture appealing to his educated countrymen in favor of Christianity, and proving to them that their own ancient books, coeval with some of the Hebrew prophets, give distinct utterance to the fundamental doctrines of Scripture of incarnation and atonement through a Divine Saviour, while they are utterly silent as to those pillars of modern Hindooism, idolatry and caste. He impressively says: "If it were possible for those hoary Rishis (saints) to reappear in the world, they themselves would exhort you—nay, beseech you, implore you, perhaps constrain you—not to neglect so great a salvation." This appeal may have the more force as the Hindoos themselves are questioning the validity of their religion. Three hundred of their most learned pundits recently met in Calcutta to consider whether modern Hindooism is correct or not.

THE Rev. Charles Kingsley, a man of very broad and "liberal" views, wrote to a friend, "You are a sanguine man,

my dear sir, who ask me to solve for you the riddle of existence, since the days of Job and Solomon, the days of Socrates and Buddha; the especial riddle, too, of our time, with its increased knowledge of physical science. But what I seem to know I will tell you. Knowing and believing a great deal of the advanced physical science of Darwin's school, I still can say I do not believe in the existence of law. 'Laws of nature,' 'laws impressed,' or 'properties impressed on matter,' are to me, after careful analysis of their meaning, mere jargon. Nothing exists but will. All physical laws and phenomena are but the manifestations of that Will—one orderly, utterly wise, utterly benevolent. In Him, 'the Father,' I can trust, in spite of the horrible thing I see, in spite of the fact that my own prayers are not answered. I believe that He makes all things work together for the good of the human race, and of me, among the rest, as long as I obey His will. I believe that He will answer my prayer, not according to the letter, but according to the spirit of it; that if I desire good, I shall find good, though not the good which I longed for. And 'law' and 'necessity' I look upon as phantoms of my own imagination, always ready to reappear, but always certain, likewise, to vanish again, before one sound blow of careful logic or of practical life."

PROF. BARKER, in his address as President of the American Scientific Association, thus described (with seeming approval) the "true psychology" of Bain, Maudsley, Spencer, etc.:

"Emotion, in this new science, is the sensibility of the vesicular neurine to ideas; memory, the registration of stimuli by nutrition. Reflection is the reflex action of the cells in their relation to the cerebral ganglia. Attention is the arrest of the transformation of energy for a moment. Ratiocination is the balancing of one energy against another. Will is the reaction of impressions outward. And so on through the list."

MANY men make a public avowal of unbelief, while their hearts are impressed with the Bible, and they feel that the Christian religion is the only hope of mankind. Ethan Allen, when his little daughter was dying, recommended her to die in the faith of her mother, and to disregard his own scepticism. Diderot, the leader of the French Encyclopædists, seems to have been equally dishonest, if we may believe the following anec-

dote: He was found one day by a member of the French Academy, M. Beauzet, explaining a chapter of the Gospel to his daughter seriously, and with the concern of a most anxious Christian parent. His visitor expressed his surprise, and Diderot said, "I understand you, but, in truth, what better lesson could I give her?"

PROF. CHRISTLIEB, of Bonn, has been lecturing in Edinburgh. Scotland seems willing just now to learn from Germany upon the theological issues of the day. Prof. Christlieb took occasion during his visit to say that the accounts published in regard to the infidelity and rationalism of his native land have been exaggerated. He says about seventy per cent of the clergy preach the Gospel more or less fully. We doubt whether the British Isles could give a more favorable statement if the whole truth were known.

IN the year 1806 the French Institute enumerated not less than eighty geological theories which were hostile to the Scriptures, but not one of those theories is held to-day.—*Charles Lyell.*

PRES. PORTER says that juniors in college frequently are evolutionists, but seniors usually get over it, and he predicted that in ten years the theory will be fully exploded; and Prof. Christlieb speaks of the theological speculatists of Great Britain as "a class of minds who have gone just far enough into German speculation to be dazzled by it, and not far enough to master it."

LORD BACON'S PRAYER.—"We humbly and earnestly beg, human things may not prejudice such as are divine; neither that, from the unlocking of the gates of sense, and the kindling of a greater natural light, anything of incredulity or intellectual night may arise in our minds toward divine mysteries. But rather that, by our mind thoroughly cleansed and purged from fancy and vanities, and yet subject and perfectly given up to the divine oracles, there may be given up unto faith the things which are faith's. Amen."

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American Institute of Christian Philosophy,

No. 4 Winthrop Place.

CHARLES F. DEEMS, D.D., LL.D., *President.*

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John Bascom, DD., LL.D.	Rev. Bishop Hurst,	Noah Porter, D.D., LL.D.
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THE

CHRISTIAN PHILOSOPHY

QUARTERLY

July 1882

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THE GAINS AND LOSSES OF FAITH FROM SCIENCE.

[A Lecture delivered before the Summer School of Christian Philosophy, 22d July, 1881.]

By John Bascom, LL.D.,
President of the University of Wisconsin.

We find it convenient to speak of the conflicts of science and religion; the language covers for us a very important and a very conspicuous fact. And yet it remains true that there can be no conflict between science and religion except as one or the other or both are misconceived. So far as they each pertain to facts and are facts, they must be in harmony as parts of one structure.

We would open a discussion on the Gains and Losses of Faith from Science, with a most thorough and thankful recognition of the great accessions to human life that have accompanied the growth of science. Science is a disclosure of a part of the kingdom of God. It is ancillary to natural theology, and has wonderfully broadened our spiritual horizon. There is no more discussion to be had as to the fitness and benefit of science than in reference to the fitness and benefit of light. Where then is the opportunity for conflicts and losses in its relation to religion?

There are two occasions of confusion and mistake in harmonizing knowledge; two reasons which lead us to speak of conflict between its different parts. We identify science and religion with our conceptions of them respectively. We have no absolute standard of either. There is, therefore, as neither is completely understood, an opportunity for conflict between them. The normal result of this discrepancy is a correction

and enlargement of our knowledge in one or both directions. This form of modification will fall more to religion than to science, as science has been the result of more recent, searching, and cautious inquiry; as religion in its completeness has grown up in many obscure ways through many dark centuries. The force of reason is greater in science; the force of historic growth is greater in religion.

It is a grand and God-given labor which has fallen to us to recognize freely these two sources of knowledge, and to unite them in a comprehensive and harmonious survey of human life. Examples of the questions which lie for reconstruction between science and religion, as departments of knowledge arranged about distinct centres, are the method of God's government in the world, its natural and supernatural elements, the conditions on which the progress of his kingdom is hinging. These and kindred inquiries which stretch into both realms of thought, the physical and the spiritual, will long receive modified answers as our knowledge enlarges. We have now no more to say of this first reason of conflict, that both science and religion are narrow and imperfect in their conceptions. They are to find reconciliation, as all departments of truth find it, by growth.

The second ground of confusion arises from the changeable meaning of the words we use, and from the fact that we give a force to them in one meaning which belongs to them only in a much narrower meaning. We are thus attributing an absolutism to science which does indeed attach to it in its primary statements and narrow significance, but does not at all belong to it in that broad colloquial meaning in which it is constantly used in discussions which pertain to faith. If we were to understand by science, empirical knowledge of the material world; by psychology, empirical knowledge of mind; by religion, empirical knowledge of the facts of spiritual life; and by philosophy, the reconciliation of these three forms of experience by appropriate ideas covering them all, we should find comparatively little opportunity for any conflict between the facts of these several sorts which make up our lives. The disagreements and destructive criticisms almost all appear in the region which we have termed philosophy—the region which lies back of science, back of psychology, back of religion, the supersensible region of the

freest thought, where the mind is struggling after the highest unity in its rational life. Science suggests its philosophical solutions of the universe; psychology, its solutions; and religion, in turn, its solutions. These wide-ranging explanations, as drawn respectively from one third of the field to be covered, immediately fall into conflict with each other. Now if we insist that these suggestions of science in the realm of philosophy have something of the same authority that belongs to its empirical facts, we can easily bring them to bear in a destructive way on the accepted facts of psychology and religion. Each attacking army pitches its camp and marshals its forces in the region of philosophy, and thence invades the territory of its rival. This warfare is incident to an insufficient philosophy, a philosophy that does not accept freely all the facts of empirical science, empirical psychology, empirical religion, and harmonize them in one comprehensive view. This difficulty can only be overcome by a higher and sounder philosophy, and constitutes the great incentive to such a philosophy.

Here again, however, science has an advantage. Its facts are more numerous and more verifiable than those of psychology; more immediate and persistent than those of religion; in a sense more manifest than either, and better and more generally understood. Scientific thought thus acquires an easy assumption and unperceived egotism that readily overawe less reflective minds. In this conflict, never to be deprecated, and not to be extinguished save by rising to a higher level of truth, psychology needs more carefully to analyze and confirm its facts, and still more is this true of religion, whose experiences are so changeable, so various, and so widely scattered through the whole realm of history. Fundamental as religious truth is in human society, it flickers before the eye, and human life must be carefully and discriminatingly searched for its ultimate and undeniable elements. For this reason it is that practical religion, in bringing vividly to the vision of men the very facts under discussion, is so often the correction of theoretical unbelief.

Our present philosophical difficulties, in this last and largest reconciliation of truth, are found in the circumstance that we have not the three classes of facts, those of matter, those of

mind, those of spiritual life, in their distinct character and full force before us. One form of experience has spread over the surface, like oil over water, and given to the whole its own shimmering and colored reflection. The remedy is broader and better facts in these departments; wider and wiser philosophy in their reconciliation.

In behalf of clearness of thought, we have made first this presentation of the grounds of the existing conflict and of its ultimate solution. We now turn more directly to our present purpose, a statement of the gains and losses of faith.

An obvious advantage to faith arising from the great achievements of science is the improved civilization in which we now play our part. These advanced conditions of life multiply moral forces, give solidity and breadth to moral questions, and make the minds of men more generally and more intensely sensitive to spiritual and *quasi*-spiritual influences. The intellectual atmosphere we breathe is far more mobile, has in it more of the ozone of spiritual truth, than any the world has hitherto held. This is sufficiently plain in our poetry. Our poets do not merely love nature, they love it by virtue of a searching, analytical, and spiritual sense they bring to it. However little they may be able to give to the heart the final words of solution and consolation, they are constantly raising the deep questions of life. They no longer go tripping on, like Pope, along well-worn moral aphorisms, as if their only office was to blow one more roundelay on a familiar horn. Grant that we have put more queries than we can answer, we have put them, and that is the first step; and we have put them because society is awake in a wonderful degree to them, is accustomed to great things, and knows not from what quarter new things and great things may now come to it. This enlarged and active arena of life is worth everything to life, your life and my life, and so ultimately to that impressible and powerful life with which God is to take full possession of the world.

A second gain is our greatly increased sense of law. A complicated and far-reaching plan has necessarily to an untrained mind the appearance of confusion. The range of order in the world and the principles which control it are too profound to be entirely obvious. Difficulties and objections under the gov-

ernment of God lie everywhere on the surface, and are not to be removed except by a broad and penetrating view of first principles. Natural theology was for a long time a mere gleaner in the field of wisdom, finding here and there nice adaptations in things dead or things living which seemed to express divine forethought and oversight. Modern science has altered the face of the world. It traces everywhere general laws of order, which branch out into the most extended and remote adaptations. The ideas of plan and relation have become universal. There is no dead material in the world; nothing which is simply passive or negative; all is active, constructive, harmonious. Science from this point of view is nothing less than the thought of God breaking from its concealments of expression, and becoming visible and audible on every side of us. Science is the omnipresence of his wisdom. The light is no longer a faint percolation through clouds. It parts the clouds before it. This sense of an absolutely pervasive plan and purpose is of infinite worth to men's thoughts. The manifest intellectual elevation of our century is due largely to it. We have held to our lips for two hundred years intoxicating draughts of knowledge. We are only waiting to be sobered by equal gifts of wisdom and grace.

Out of this sense of universal law, there springs at once a feeling on our part of immense reserved powers. Where law is, there we can follow and make use of its provisions. The world is put into our hands by its laws, and it ceases to be dead to us as it has ceased to be dead to Infinite Reason. It pulses everywhere with the life of reason, is subject to reason, and we share that reason. There is something spiritually startling to us in the successes of our inventions. We speak into a wooden ear, and miles away the muffled voice offers itself to a human ear. Is this framework, this soil and rock, as permeable to suitable agencies as the body of man to the touch of mind?

Power, universal, inexhaustible power, goes with this universal, inexhaustible plan, and we are co-workers with God everywhere; not merely when we sow our fields and commit the harvest to his care, but when we build our shops, travel our roads, frame our laws, and lay the foundations of physical, intellectual, and spiritual life for our posterity. God is with us

everywhere, extending and prospering our labor in the exact degree in which we bring to it wisdom and virtue.

I need now hardly say that the one idea always growing under this regimen is that of responsibility, and responsibility is the germ of spiritual life. Spiritual life rests on the sense of power, and power is found in this growth of knowledge. Thus our power is so expanded that the living tree does not so appropriate the soil, the sunlight, and the shower, as we the world above us and about us. This truly rendered into the language of the New Jerusalem is the omnipresence of our gracious heavenly Father whom we love, in whom we live and move and have our being.

We are brought by these universal facts of law, unfolding themselves progressively in evolution, in contact with the world in a new way. It is not only capable of redemption, it is being redeemed, and the questions put us are, What will we do to further the work? and What part will we have in it? An idea that has haunted religion, and one that has a figurative basis in a passing form of truth, has been that the world is an ally of the devil, and that men are to be redeemed out of it, rather than to be redeemed with it. This idea slowly transforms itself into its true expression under the facts of science. The great physical and moral movement in the world is disclosed, our part in it is laid out for us, and we already see that, without any descent from heaven with a conquering host, Christ is to reign on the earth with a fulness hardly dreamed of by those who first caught prophetic sight of the fact. We are thus led to shape our lives daily to an orderly work of salvation, to the infinite advancement of the present and of the future. Just here especially do we better understand the divine method. We have regarded the wish and the will of God as the child regards his own wishes and will, as things that may act instantly and impulsively with slight reference to means. We have sought reverently to recognize a divine will of this same child-like order, and prayerfully to lay hold of it, and so to build up a kingdom with slight foundations in our own character and actions. The facts of science, the facts of the world as God has made it, exclude every such idea. They disclose an intellectual world firmly built on and into a physical world, and a spiritual world

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resting on both and towering over both. The will of God runs with the reason of God, and so must our will. Will is not bursting of bonds; it is the forging of bonds, only they are the bonds of wisdom and grace; it is not the overthrow of law, it is the enthronement of law. We shall by and by cease to antagonize the will of God to the ways of God, or look upon mere will as the pivotal point of revolution. True will is the personal efficiency which runs along the lines of reason. In the degree in which the world gains by this sense of Divine Presence do our lives gain in hopefulness and usefulness.

Another distorted sentiment in religion has been that God is exalted in the proportion in which man is debased, and that there is some sort of antithesis between the two. This impression is one of the early illusions of sin, and has significancy in a region of mirage. As man gathers into his own spirit the true currents of life and hope, he understands that these are in some very full and proper sense the immediate gifts of God, and that in the very degree in which he has power is he in the image of God, a partaker in his life, and able to enter into his honor. The idea of fervent fellowship displaces that of fearful prostrations, and that too with no loss of humility, for is he not cradled on an illimitable ocean of power, and is he not consciously coming under the shadow of the truly great and sublime?

It matters not that these higher spiritual states are not yet fully realized as the fruits of science, but that states are often fallen into which are quite the reverse of them. This is a common fact in spiritual architecture as in all architecture. A wall may be run up which stands strangely alone and shows ragged sides. We must wait till the work grows proportionately, till every surface has been treated, and face answers to face in a finished whole. It may be that these roughest parts will then bear the best delineations of art. Where now we have only the foolish pride of opinion, we may at length have the most perfect reflection of the divine thought.

But here we come to what is the more obvious fact in our time, that science has brought serious losses and injuries to faith: that our accustomed highways are obstructed by building material; that our feet stumble on the fragments that

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lie about. These illusions of thought are real, not imaginary, and are to be ascribed partially to the giddy minds that hold the science of the world, and partly to the fearful ones that hold the religion of the world. It has been interesting to observe how the notion of fixed, inflexible law which science has offered has united with the notion of arbitrary will which religion has offered, and how the two have ensphered themselves like coalescing drops around one centre. In a union of this sort the religious idea is likely to be the bastard one and lose its position. The fixed will of God, his election when it sinks into a natural law, disappears as will altogether. There have been these semi-physical conceptions hovering about the spiritual world that have prepared the way for this sudden invasion of science. They will affiliate with these new friends, and ultimately be driven out with them.

But the real secret of our present difficulty is the tendency of the human mind to extreme and uncompensated movements, its rhythmical advance by alternate excesses. No productive power or principle is arrested among men till it has exhausted itself in all allied errors. One idea tyrannizes to-day over the intellectual world; it is that of law, under the narrow type of physical law. The methods of physical inquiry and its conceptions are all-prevailing, though the physical world is not more than half of the ensphered universe, and the lower half at that.

This revolution of the world in favor of one idea, and its bitter reign over us, is, like a French Revolution in secular history, a fact of the first order in the intellectual history of the world. While its gains are immense, its evils also are very great, and they ultimately expend themselves on faith. This revolution is a revolution in favor of matter as opposed to mind, as holding and defining the productive forces of the world. It is quite immaterial that Spencer, or any philosopher, declines to pronounce in behalf either of matter or of mind as the ultimate existence, the laws of mind are made to assume the same necessary and fixed character as those of the physical world; and the task is definitely set as the goal of science to explain the entire facts of the intellectual and moral world in terms of matter and motion. Law is made universal, and necessity is

associated with law. Hence that kind of fixedness and fatality which belong to simply physical facts come creeping over all facts, as mists of the low lands rise and spread over the hills. The immense stretch of the physical world, its unmeasured antecedence to the appearance of mind in man, become the impressive and oppressive terms both for thought and imagination, and the idea seems preposterous that these fag-ends of results should have any other or any higher law than the things that have brought them forth. Yes, matter and motion have been from eternity, and man's acts, individually and socially, must be translated into these expressions before their true genesis and true value can be seen. Hence we have a cosmic philosophy, a philosophy of the universe, man appearing in but one act of this great drama, and in this act not so much in completion of its plot as in its simple continuation.

This is the first loss occasioned by the new, the empirical, the cosmic philosophy in its relations to faith. Between matter and man, in the fundamental character of the laws involved, there ceases to be any difference. The laws of life, the laws of thought, the laws of conduct, the laws of society, all rest back on physical laws, and are pervaded by these primary impulses. Intelligence, thought, liberty, duty, are transformed into the latest products of the soil. This fatalistic and fatal metamorphosis would be much more startling than it is, were it not that men do not more than half understand it. The language of the old philosophy is retained, and carries with it in a glimmering way the impressions of previous convictions. Desire, thought, will, choice, are all named, and are supposed to stand for their proper selves, whereas not even the ghosts of these notions are covered by the words as used in this philosophy.

Notwithstanding the great apparent lucidity of Spencer, I venture to affirm that very few books in our language are more obscure and misleading than those of his philosophy. If its conclusions could be stripped of the illusions of language, could be stated boldly and baldly in strict terms of matter and motion, they would be rejected at once. The empirical philosophy involves throughout a subtle play of imagination by which physical images are brought to the explanation of spiritual things, without covering the very substance of the facts in-

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volved, and without venturing to put physical connections consistently and fully in place of these facts. What men take to be cosmic philosophy is simply a shadow of physical relations cast on a background of personal, spiritual ideas, and blended with them in infinite confusion. The result is that the powers of mind are greatly weakened and obscured, though we may not discover that they have suffered a total eclipse.

With this first loss to faith comes a second. If the force of reason is reduced in man, it is correspondingly reduced in the universe. If man is a product of the soil, if his mental operations are to be expressed in an equation whose reduction leaves on one side only known terms of matter and motion, then the Infinite Reason comes under the same treatment as does its type, the finite reason. The ultimate formula of the universe is expressible in terms of matter and motion, and whatever the power of personification can do for these ideas can be done for a Divine Being, and nothing more. And there is truly nothing more surprising than this latent force of the personal, spiritual element in the mind of men as expressed by these very powers of personification. No sooner has a philosophy removed all rational foundations of faith, got down to the bed-rock of physical facts, reached the ultimate elements in the universe, the wood and the stone of construction scattered everywhere, than, by way of consoling itself and its disciples, it lets loose these powers of personification, and forthwith there begins to rise in the background Infinite Force, the Unknown, the Inscrutable Power, the Not-ourselves-that-makes-for-righteousness, and before we are fairly aware of it, out of these ashes of reason, there has arisen a shadowy semblance of Deity to evoke once more the reverence and call forth the faith of men. In proportion as men have done their spiritual nature violence in sinking, do they seem to delight to give play to its buoyancy as it begins to rise again. There is a good deal of cosmic philosophy that starts with a wise, derisive, cynical smile, and ends with closed eyes and an anthem. We do not wish to criticise the anthem, we only remark it as the last flash of light in the socket in which the beaten oil of the sanctuary has been consumed. Consistency is all we wish in cosmic philosophy. If it were thoroughly consistent, it would quickly destroy itself.

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With the loss of a clear sense of a Pervasive Presence of reason in the universe, there begins to pass away, as a matter of course, the conviction of immortality. If the supreme reason does not embrace conscious personality, but finds only obscure expression in matter, we have no right to expect that finite reason, gaining consciousness for a moment under a favorable conjunction of physical conditions, will be able to retain it when these have been swept away. Our promises of immortality arise from the likeness of our reason to the Supreme Reason, the fellowship of our reason with the Supreme Reason, and when these terms are cut down to the co-ordination of physical laws, we must go back to the physical world if we would ask any questions in reference to the future, and this world makes answer in the quick corruption of the grave.

Here again the most remarkable fact which this philosophy presents is the great difficulty it finds in grubbing all spiritual roots out of the soil. No sooner has an immortality of the individual been lost than a sort of immortality of the race is brought forward to take its place. We shall not live; others will live; let us exalt their lives. A noble impulse this, one more sporadic shoot from our mutilated spiritual nature; but it cannot take the place of the entire plant. A continuity of mortal beings is not immortality; it is rather an endless procession of the dying. It is the word, death, drawn out and emphasized to the last letter. No matter how successful we may be in improving individual life and the collective life, this improvement brings no redemption. We are simply selecting the fairest of our youth for Minotaur. We are making the contrast between life and death each year more horrible. Because life is more to be coveted, it is taken not the less quickly from us. No, the improvability of the race is not the real remedy of mortality. What a George Eliot really finds, what she truly prizes, is the love of man wrapped up in her own spirit. Alas! that a napkin holding such a talent should be hidden in the earth.

So the synthesis of humanity which Frederic Harrison preaches with the enthusiasm of a prophet is but an afterthought. It is the second commandment rescued when the first has perished. Such devices are a melancholy stirring of

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the embers that the sparks may once more fly heavenward. It is a discouraging effort still to urge a good action when the immediate motives for doing it have been lost. John Morley's summation of a true spiritual attitude is an admirable one. In speaking of Burke, he says: "We could only wish that the years had brought to him what it ought to be the fervent prayer of us all to find at the close of the long struggle with ourselves and with circumstance—a disposition to happiness, a composed spirit to which time has made things clear, an unrebellious temper, and hopes undimmed for mankind."

But such a result can only be realized when we feel to the full the force of spiritual life, and the life in us making answer to the higher life in the universe about us. We admire the skill and we honor the virtue with which these men and like men hold fast the inheritance of the race after they have cancelled its title-deeds, but we do not believe less certainly that there is involved in this method ultimate bankruptcy.

The philosophy which lies back of physical science strives to build a spiritual kingdom on foundations far too narrow to sustain it, and out of materials far too coarse and unsubstantial to receive its labor. It has, therefore, resulted in the steady debasement of the very conception of spiritual life. What is the remedy of the evil? We believe it to be a broader and sounder philosophy, a philosophy that covers not only the facts of the physical world, but those of mind and religion also. An obstacle to this philosophy, in addition to that of an exaggerated scientific temper, is a false religious temper which will not appeal to reason, nor freely accept the decisions of reason. Reason is distrusted as if it were not the central gift of God, as if it were in some way in league with science, opposed to faith, and ready to waste the fruits of revelation. What the eye is to light, that is reason to the truth. If we can truly charge any system with irrationality, that system must give way; if we can affirm of any statement it is rational, that statement must gain ground in our thoughts. We have two sets of gifts, the powers of comprehension which God has bestowed upon us, and the things to be comprehended—the revelations of one order or another which he has made to these powers. The revelation cannot contradict the power or go be-

yond it. The power is the first, the most fundamental gift. God is nowhere more present to us than in a thorough use of our powers. It is by them and under them that all progress is to be made. When religion disparages these powers, or robs them of any portion of their office, it does it to the endangerment of all healthy growth.

But the devout mind will say that this assertion is made in oversight of the office of the Holy Spirit; that we are to look to this Spirit as the ultimate remedy of unbelief. Herein an obscure antagonism is allowed to spring up between the natural and the supernatural, between reason and faith, between God's action in us and his action beyond us. One of the very things which science should help us to correct is the tendency to conflict at this point. Let us not by any means lose the supernatural, but let us not in any way oppose it to the natural, or supersede the natural by it. It is this proclivity in religion to cast itself blindly on the supernatural which has offered a weak point to the attacks of science. The Holy Spirit is most present when men's thoughts are most active and most just. We have no more reason to suppose that it is any part of the office of the Holy Spirit to override reason than it is its office to obscure the eyes or close the ears. That much which has been ascribed to the Holy Spirit has had an effect of this sort in it is undeniable, but this portion has not been the pure gold, but the alloy. It is this very alloy which has made so many moral movements so partial a benefit. Will any one venture to say that in the degree in which the Spirit of Truth is present, the truth itself will not be seen and understood? What, I pray, is a profound understanding of spiritual truth but the most divine insight? And is not this an insight to be reached and sustained by the most thorough and the most guarded effort? Humility is rightly insisted on, not because it is the humbling of our thoughts, but because humility is wise and helps to lift our thoughts. We need all native power, all diligence of inquiry, every method of instruction, and the utmost purity of spirit as the conditions of a sound philosophy which shall disclose broadly the ways of God, ways that lie along the heavens like beams of light, and are not to be fumbled after in darkness.

In securing this philosophy we need a clear, careful, bold

statement of the facts of mind and the facts of religion, made on their own basis, under their own form of experience, and held fast to as being at least as plain, as primitive, and as worthy of belief as any facts whatever. It is because this empirical philosophy, so called, has in its interpretations destroyed the first facts of experience in the realm of mind that that realm seems just ready to be submerged, like a sinking island, under the waters of oblivion. Nothing is plainer, and nothing can be made plainer, than that mind thinks, and that thought is obedience to the laws of truth, and that this obedience includes a clear perception of the truth and a free following after it. Forget these first principles, make this movement a necessary physical fact, and thought itself disappears, and with it should sink at least this philosophy of systematized degradation. The world is full of vital facts and intellectual facts and moral facts and religious facts, which can only be explained by a cosmic philosophy by being explained away as illusions. But they are not illusions. If any portion of the world in which we move should be discarded,—and no portion of it should be so discarded,—it is the sweet and the sour, the hot and the cold, the hard and the soft, the still and the loud, the red and the green, of our physical experience, which exist neither here nor there, neither in things nor in organs nor in the mind, but as a changeable set of impressions sustained by all these, as light dances on the surface of a stream in motion. Settle back to the first facts, the *empirical* facts, that we think, that we love, that we plan; let these facts carry with them what they include in any rational apprehension of them, and henceforth the entire invading army of physical conception is routed, and left to pitch its tents on its own arid plains once more.

In this way shall we reach both a natural and a supernatural, and see how firmly and how quietly one lies above the other, as the heavens above the earth. These two terms expound each other. For all purposes of comprehension or use we lose one in losing the other. The natural includes all that whose nature is defined under fixed forces and fixed laws; all that is immobile save as it glides on in the grooves prepared for it, obedient to properties and energies already present to it. A type of the natural, though the natural is far more comprehensive than the

image may seem to imply, is a machine already in revolution under measured forces that have been applied to it. Now what is this physical, this natural world, broad as it is, capable of by itself? It can fulfil its own circuits, and that is all. It cannot comprehend itself, unless comprehension is a revolution of one of its own wheels; it cannot use itself; it cannot direct itself. It remains simply a fact of complex motion, but a dead fact none the less.

We bring to the natural a supernatural. And by a supernatural we understand all powers whose laws give limits, but not lines, of action, whose putting-forth involves changeable adaptations, a spontaneous impulse fitting itself actively to exigencies. Pure thought is the type, thought that carries forward a logical process from within itself toward the truth. The supernatural so understood, in order that it may do anything, bring forth any permanent fact from its own movements, must be put in connection with the natural. This natural immediately it can comprehend, can direct, shape, and use. The two assume instant and complete significance in reference to each other. The natural is firm within itself, simply that the supernatural may lay hold of it, work upon it, work with it, and so record itself by means of it. The supernatural has, on the other hand, freedom within itself, as the essential condition of all thought, use, power. Between the two, the natural and the supernatural, the rational universe is constructed. All that is fixed is fixed for a purpose, and all that is flexible is flexible under a purpose. Knowledge proceeds, use proceeds, conduct proceeds, character proceeds, yet none of them are determinate and none are evanescent. There is change without instability, and stability without fatality. In other words, there is exactly what we find, a moral universe.

Looking now more narrowly, we shall readily see the part played by Revelation. The eye purged to the point of prophetic vision, the will uttering a mandate that goes beyond the nerves of the body and forces its miraculous way among physical things, as if these, too, were organized into obedient, vital connections, are after all in full sympathy with the supernatural in the world, itself lying everywhere above and about the natural, like an atmosphere. The miraculous is but a disclosure of

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the supernatural beyond its ordinary limits. We are taught by it that these limits are only passing conditions of order, and may be contracted or expanded under new exigencies. Oxidation may proceed slowly, with little heat and no light; or it may break out suddenly in intense heat and brilliant light. The miraculous is only the supernatural energies of mind in unwonted action.

It is of the highest moment that we understand that the foundations are the natural; that the supernatural is the superstructure built on these foundations; that Revelation is but gilded stars and crucifixes and spheres crowning tower and turret here and there. Science is helping us to this apprehension, not to the loss of the supernatural, but to a far more profound comprehension of both it and the natural. The great mistake of religion has been the separation which it has placed between the two, and its easy way of supplanting the one by the other. Its slips in theory and practice have arisen here. It has been said by a distinguished historan that the clergy have too often shown profound indifference to morality when called on to choose between justice and the interests of religion. The explanation is plain. They have antagonized the two, when they are not to be antagonized. A supernatural that is not every moment finding its way into a natural is of no import; a natural that is not every moment reaching up to a supernatural is of no service. The natural and the supernatural are, like the body and spirit of man, inseparable parts of one experience to be treated collectively without the loss of either.

It is to this synthesis that we are reaching forward, suffering for a moment under a quackery of physical nostrums and physical training simply.

RECENT PHYSICAL THEORIES IN THEIR BEARING ON THE THEISTIC ARGUMENT.

[A Lecture read before the Summer School of Christian Philosophy, 21st July, 1881.]

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THE great argument for the existence of an intelligent Creator, from the indications of design observable in nature, which, after so many intimations in the writings of Plato, Aristotle, Cicero, and others among the ancients, has been so fully presented in the numerous and extended discussions of modern writers, seems to have culminated in the lucid and ingenious reasonings of Paley, the standard volumes of the Bridgewater series, and the elaborate treatises on Theism and Anti-Theism in our own day.

Such an extent of research and such a body of argument as these works supply might well seem to have exhausted the subject. Nowhere could the theistic writers expect to find other fields broad enough to extend the scope, or rich enough to furnish more striking illustrations, of an argument so comprehensive and weighty as this had become. It is therefore of the highest importance for us to ascertain, by a careful comparison with philosophical, and especially with scientific, standards of thought, the actual value of their results.

The teleological writers had in the course of several generations accumulated such a body of significant and expressive facts, ranging over so wide a field of observation and indicating

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such felicities of adaptation between things in nature and the ends actually subserved by them, that for a long time all reply seemed hopeless, and all objection futile. Whatever reductions our advancing science might make in the number of the facts adduced, on the ground of error or misconception, still the unquestionable examples of minute and complex adjustment in nature, and especially in the phenomena of organic life, were so numerous, and the character of them was so striking, that no other explanation of their origin than that which referred them to the will of an intelligent Creator seemed, with the existing philosophy, rational, or even possible.

That philosophy was, however, based, in accordance with what was then the general, not to say the universal belief, both of the common and the scientific mind, upon the idea that a species is something fixed and unchangeable. The progeny, it was said, resembles the parent. From generation to generation, through all the ages of history, there has been no observed change. The domestic animals have continued the same since Noah received them into the ark, and since they were mummied in the tombs, or sculptured and painted on the monuments, of ancient Egypt. This is not only really, but even formally, the basis of Paley's reasoning. He observes that the fact that an animal form is derived from a long succession of parents does not in any, even the smallest, degree account for the varied and exact indications which it displays of designed inter-adjustment of its parts and members; and hence an indefinite, or even an infinite, number of successive generations would not account for such adaptations. He speaks as follows:

"Our going back ever so far brings us no nearer to the least degree of satisfaction on the subject. If the difficulty were diminished the farther we went back, by going back indefinitely we might exhaust it. Where there is a tendency, or, as we increase the number of terms, a continual approach, toward a limit, then by supposing the number of terms to be what is called infinite, we may conceive the limit to be attained; but where there is no such tendency or approach, nothing is effected by lengthening the series."

It will be perceived that in thus laying down the foundation

of his argument, Paley distinctly bases his reasoning upon the fact that there is no progressive change in a species through any number of successive generations. The latest link is a precise reproduction of the earliest. The species is fixed; it is without progressive development or observable change in that whole period of its history of which we have knowledge. On that theory, and as long as that continued to be the scientific view of the subject, his argument was unimpeachable.

Of late, however, this alleged identity or fixedness of species has been called in question. The doctrine of evolution, as presented by Mr. Darwin, has seriously modified this fundamental postulate of Paley's reasoning. It becomes us therefore to take a survey of our position, and to ascertain on what ground the teleological argument is to stand, now that the changed conception of scientific thinkers has stricken from beneath it the foundation on which hitherto it has been so confidently made to rest.

What is henceforward to be the relation of that profoundly important argument to the new views which have first shaken, and at length supplanted, the opinions which had been accepted as fundamental principles of science, through all preceding periods of scientific history?

In looking around us on the world in which we live, two great and comprehensive aspects of it force themselves on our attention—the one, a boundless multiplicity of objects; the other, a ceaseless current of events. The former are for the most part fixed and permanent; they remain ever the same. The mountain, the valley, the landscape, the home, and all the minor objects which make up these, show little change from day to day. But the events which take place around us are evanescent and fleeting; movements and changes rapidly succeed each other. The seasons, the wave, the breeze, the cloud, the storm, are seldom the same from hour to hour. The sunset upon which we gaze with delight, fades, changes, and is gone even while we gaze.

These two wide and comprehensive classes of phenomena we distinguish from each other: the former, that which is per-

manent and stable, we call matter; that which is transient and changing, we call motion; and matter and motion make up the visible universe.

The permanence and stability of matter are little apt to awaken wonder or call forth inquiry. The natural inactivity or immobility of matter, which moves only as it is impelled by external forces, sufficiently accounts for its seeming permanence. We need no explanation of the fact that a lifeless mass remains as it was. But what is the cause of this ever-recurring motion? Something within us asks a cause for each new form and phase of things, for each departure from a previous condition.

As we trace facts scientifically, we find that a vast proportion of physical phenomena belong to this latter class—they are ultimately facts of motion. The laws and methods of this motion seem very varied and different; and science naturally attributes each particular group of such phenomena to its own distinct and separate cause. Each forms a definite and peculiar science. The science of Physics discusses those movements and tendencies to motion which give rise to the phenomena of weight and pressure; that of Acoustics investigates those tremulous movements of the atmosphere to which are due our sensations of sound; and that of Optics studies the infinitesimal vibrations in which the phenomena of color and light originate. All our sensations of taste and smell suggest other and similar motions, of particles floating in solution, or diffusing themselves through the air. Thermotics inquires for the laws which govern the distribution of heat. Chemistry investigates the molecular movements by which bodies combine and again decompose. Electricity in its several forms co-ordinates the phenomena of that peculiar and most varied attraction between the particles and the surfaces of bodies. Mineralogy classifies the modes in which particles aggregate into crystals, and describes the infinite varieties of beautiful forms thence arising. Biology explains the subtle and minute movements by which the atoms of inorganic matter build the wonderful structures of plant and animal life; while Astronomy groups, describes, measures, and computes the rapid and vast movements of the celestial orbs. The facts which relate to the social state are, more conspicuously perhaps than

those of any other science, facts of motion and of activity; and Sociology has for its great aim to determine the laws which govern the movements and the progress of communities and nations.

All the facts of science are thus, either primarily or ultimately, facts of motion; and science in its widest reach is the arrangement of these facts under their various laws, and the co-ordination of them into systems of knowledge.

All motion, however, implies a something to be moved; and hence, amid all phenomena of movement and change, there must of necessity be a substance, a something which remains permanent and unchangeable. This, too, science must recognize and admit. Unable to reach it by the same method by which she reaches phenomena, she yet finds it an inevitable element, if not of her observation, at least of her reasoning and of her conclusions. There is a science, therefore, of the facts as well as of the phenomena; of the substance as well as of the properties and the laws. We have thus a descriptive enumeration—without which science would be utterly lost—of the several different kinds of matter, now some seventy in number; an account of the various quantivalences and combinations of the atoms which thus combine and act; of the three forms, solid, liquid, and gaseous, and now of a fourth form—the radiant—in which they exist; of the analysis, chemical and spectroscopic, of these into their elements; and of the permanent and fixed character of these ultimates of the physical world.

We have then two great forms of science. One deals with the fixedness, and the other with the flow, of nature; one with matter, and the other with motion. One describes the stability and permanence, the other the change and movement of the universe. They are substantially the static and the dynamic elements of the world.

Underlying both these great departments of reality is the comprehensive fact of force. Matter and motion are much, but they are not all. They form, as I have said, the visible universe; but the visible is not the whole of the universe. They need for their explanation another fact, that of force, without which neither of them is conceivable. In order to account for the motions, and to explain the matter of visible things, science

freely and confidently postulates another form of existence, which is as real as these, and still more important, though invisible—the more fundamental fact of force. They are both manifestations of force.

All matter has and must have force. It is by its very nature a resisting mass, and this fact of resistance is an exhibition of force. If any force acts upon a mass to move it, or to change its place or state, it resists the change. It opposes to this outward force an inward force of immobility, which we call inertia. If any force from without presses its particles together, it resists the compression. At first the resistance is moderate; the parts come nearer together with more or less slowness. Then a greater resistance is felt; the compression becomes more difficult. At last we reach the point where practically the compression ceases. It cannot be carried further. We reach the limit of our power; and not only this, but we learn from our very conception of matter as a reality, that there is an absolute limit to all power. The substance cannot be compressed out of existence. It must and will forever remain a resisting mass. The fundamental power which a particle of matter possesses of asserting itself, and of maintaining its reality against all the other forces of the universe, guarantees its permanent existence, and forms its characteristic feature as a material thing.

These then are the great elements of science, the objects with which she has to deal, viz., matter, motion, and force; and it is in the correlation and theoretical adjustment of these, that modern science has made its chief conquests, and achieved the great results which mark our era.

This progress we must now attempt to trace. It is comprised in two important doctrines, each of which may be expressed by a single comprehensive word. These words are EVOLUTION and CORRELATION; and the two ideas thus indicated must be illustrated at some length. Each of these words expresses the result of a long process of thought and investigation, and sums up the history of a great conflict. I shall first speak of Evolution, which must now be described and elucidated.

The general doctrine taught under this name may be stated

in some such form as the following, viz.: That the objects of the physical world are not largely the results of a series of sudden and instantaneous acts of immediate and out-and-out creation, but have come into existence by a process of development, (1) from small beginnings, (2) through minute and prolonged changes, (3) through the agency of material forces, and (4) going on in accordance with general laws.

In the discussion of this subject it were well to remember, what is often overlooked by its zealous opponents, that although formulated by Mr. Darwin, evolution is by no means confined to his speculations upon organic life. On the contrary, the idea originated long before his time, and must now be regarded as the embodiment and outcome of that great series of researches which constitutes the science of our age. This will become abundantly evident upon a reference to the history of the inductive sciences.

The scientific assertion of the doctrine of development began something like a century ago, in the announcement of the nebular hypothesis by La Place.

This doctrine has been taught under several modifications of form, which amount almost to distinct theories; but disregarding these minor differences, and assuming only the general reality of the progress which is described under the name of the nebular hypothesis, I observe that the history of this comprehensive force-action carries us back to the time when the whole of our existing planetary and solar system was a mere vapor, filling in every part the space through which its orbs now revolve. The sun was not yet a consolidated body, but only a central point, from which on every side extended a vast mass of vapors or gases, altogether without defined shape or precise constitution. Slowly, with the lapse of that infinite time which the lights of heaven had not yet been appointed to measure, a vast circle of revolution established itself, as gravitation drew each unformed particle closer to the centre, and of course to the rest. The motion which we call heat, the phenomena that we name light, first revealed the existence of the monstrous and unformed mass to such intelligences, if such there were, as were privileged to witness it. Chemical combination came next, the fact of which light is the expression and in many instances the immediate an-

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tecedent. Mechanical aggregation followed, as one revolving ring after another was thrown off by the increasing velocity of the narrowing revolution. Finally, as new centres began to be established, orb after orb shaped itself to its perfect form; and each took its place in the series, and joined hands with the rest, in a system of revolving globes which stretches from the sun to the outermost planet of our system.

The characteristic fact of all this marvellous history of the formation of the heavenly bodies, is that the Universe took shape and adjustment under the forming agency of the great forces of which I have spoken. Gravitation, in its familiar form, may be conceived as the initial force-movement; heat, with its expansions and condensations, was perhaps the next great agency; chemical combination began to occur as particle came within the sphere of particle; each varied form of force took up its work as the appropriate conditions came into play, until together they shaped the system, and gave to our globe its peculiar character.

The end of all is the conviction that our globe is not eternal; that it has been fashioned, through an indefinite succession of ages, into its present form, from a condition of matter so elementary that it passes all imagination to conceive it aright. At first naught existed save those rudimentary particles which we now find combined in the various substances around us. Similar results have also taken place in the broader regions of the universe. Each star that glitters in our firmament has passed or is passing through the same forming process, and attests the working of the same mighty agencies through these blue depths above us and on every side.

Nor this alone: beyond, stretch the numberless nebulæ, reporting themselves to the eye in dim specks, which fade, as the distance increases, into utter indistinctness. Yet as our more powerful telescopes reveal them, they wreathe themselves into masses which tell us the wondrous story of their formation. Here is one, circular in form, a complete ring of nebulous matter, save that at one point of the circumference a break has occurred, where a part has been thrown out from the rest by the violence of the centrifugal force; and there it lies projecting far, in lines that radiate outward, not yet gathered up into its new form.

There is another, which after having gone through the same process of first forming and then breaking a ring, has doubled back the two loose ends, and commenced the formation of what is yet to become two orbs revolving round each other—a binary star. So, too, we might trace the movement onward, and still find in these immense and boundless systems additional indications of the progress of the magnificent work. Through age after age the slow revolution goes on, the mass gradually condenses, the appropriate combinations take place, and each mighty and complex system shapes itself to its ordained and final form.

Now the characteristic feature of this all-embracing theory of astronomical progress is that it describes a most comprehensive system of development. It alleges that the heavenly bodies have been formed slowly, and through long ages of imperceptible change, taking place through the agency of material forces, and by the regular operation of general laws. It has brought all the cosmical arrangements of the heavens and the earth into relation with each other, as parts of one all-inclusive system of astronomical development. It was therefore the first great phase of the modern doctrine of evolution.

Next comes Geology, with its more specific and unquestionable affirmation of the same general ideas. It teaches that a long course of similar developments has shaped our globe and given it its present adaptation—an adaptation which it did not originally possess—to be the abode of man. Its primordial condition was that of a revolving mass of igneous matter, on which a crust of slag and scoriæ was slowly formed, by cooling, before the temperature was sufficiently reduced to allow the existence of water upon its fiery surface. At length, as the cooling proceeded, water became possible, and the gathering together of waters took place which we call seas.

Then began the prolonged work which has given us the vast body of the strata that form the geological series. Immense systems of rock,—Archæan, Silurian, Devonian, and the rest,—each of them thousands upon thousands of feet in thickness, were successively laid down in the ocean beds, by slow and regular deposit of sediments.

These strata, originally level, were tilted up into mountains,

with their intervening depressions that formed valleys, or were piled upon each other in monstrous contortions, through the expansions and contractions of the mass; and still cooling and consolidating, they slowly grew, through the same silent and ceaseless changes, into the form and order of the rocks which we have so largely traced, and which we so familiarly know.

Next life appeared, and this too at first was in rudimental forms. The protophytes and protozoans, in which palæontology assures us that animal and vegetable life began, were at first so low in organization, that it is to-day a question which divides the students of primitive palæontology whether the alleged types, like the *Eozoon* and the *Palæotrochis*, were ever endowed with life at all. We cannot draw any exact line, and say, "Here life began." A wide gap separates these humble beginnings from the higher forms which at length followed. But later, in place of the crude material and the elemental types, organic structures began to arise, till distinct and recognizable forms claim our notice. The trilobites and the brachiopods showed themselves in numerous species, the endless varieties of which, now grown familiar to science, matured and perfected their organizations, and led on to the higher forms of our natural-history scheme. Mail-clad fishes took possession of the deepening waters of the ocean, and reptiles crawled in the wide marshes of the coal measures. The mis-shapen pterodactyl sported in the murky air, and gigantic saurians cleft the ancient seas with their paddles. Huge mammals lift their heads from the ground and tread, with ponderous feet, the increasingly solid land. Higher and higher forms make their entry upon the scene; till at length man stands erect, the lord of creation, and raises his face of intelligence to the skies, uniting earth to heaven by a nature, rational and moral as well as animal, which partakes of both.

In all this process we have disclosed to us the same fundamental ideas already noted as characterizing the evolution scheme in astronomy. The beginning is in minute germs, or in rude forms so imperfectly organized that the structure is scarcely discernible. The progress is by insensible gradation, though not indeed universally. There are sometimes great and sudden quickenings of the movement, in which the slow gradation bursts

out, so to speak, into new forms and unlooked-for developments, whose immediate predecessors do not appear in the series; but characteristically, the development is regular and orderly, and the march proceeds by slow steps.

Lyell has laid down for us the law which governs it, in his pregnant and memorable announcement of what has been called the Uniformitarian theory in Geology—that all the changes of this great physical progress have been produced by the slow operation of the same causes which we now see at work, with ceaseless and steady though moderate energy, in the world around us.

This theory at first startled the world. It was almost incredible that processes so seemingly gentle and orderly should have contorted the rocks, and lifted the mountain summits, and worn away by denudation miles in thickness of the firm and solid strata of the globe; but to-day every geologist has adapted his conceptions to it, and no man questions the substantial truth of the assertion. It will no doubt need some modification. There seem to be some facts which refuse to come under the comprehensive generalization. There have been sudden and violent changes, as well as slow and gentle ones; cataclysms, as well as processes; storms, as well as calms. But substantially, with whatever modifications, the dominant idea prevails. The earth has been wrought into its present adaptations to man's use, by a lengthened series of operations, developing it, and all things upon it, to their present dimensions and proportions, by the steady and uninterrupted operation of what we call natural causes.

In this striking account of the physical history of the earth we see the second great phase of the development hypothesis as presented in geology. A third, still more startling and revolutionary, remained.

All this did not touch the great world of organic life in our existing era, in which the theist had hitherto found the chief materials for his argument. The structures of the existing tribes of animals had evidently, he maintained, been formed by intelligence, and with a specific design to adjust each part to its function and its use.

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But now, after many a crude suggestion of the same idea, Darwin came forward, claiming that the organic beings which fill the earth had, by the same silent and progressive series of changes, been produced from pre-existing forms. The more specialized had arisen from the less, in an endless progress. Those of to-day are the progeny of ancestors of yesterday; and those of yesterday were but the modified descendants of those of an earlier day. Thus the existing species of animals and plants might be said to have been derived by laws of heredity, of variation, and ultimately of natural selection, through the varied and multiple forms of the intervening periods, from the early and humble types in which the palæontological series of the rocks had its lowly, and almost imperceptible, beginning.

The religious bearings of this far-reaching scheme of thought were at once perceived to be of a most important and even vital character; and the scheme itself was looked upon with great distrust.

In all this wonderful progress there seemed to be no need of a creative intelligence for the adaptation of the various parts and organs of animal bodies to each other. It was all accounted for, we were told, by the simple operation of physical causes. It was all accident, shaped to its seemingly happy issue by a selective process going on in nature itself, through the mere friction and interaction of its own laws. Generations of plants and animals vary somewhat from age to age. These differences accumulate with years, till new types are formed, which develop first into new varieties, and at length into distinct species. Those which happened to be—for there was no design in the purely physical and material causes which shaped the process and its results—those which happened to be better adapted than the rest to the circumstances in which they had to live, the hardier plant, the swifter or more cunning animal, survived; those of less fortunate organization, of less happy adaptation, died, in the struggle for life, which came on with the cold of every severe winter and with the long drought of every arid summer. The feebler, the clumsier, the less acute in sensation, the less alert in movement, perished in the snow, the famine, or the drought; their better furnished rivals lived, and they propagated a finer

and more highly specialized type of the species. The process went on till every defective form was eliminated, till every organ had been modified and shaped to its happiest adaptation, and till the remaining forms displayed a nicety of adjustment to their place and their function, which seemed to be the work of a designing mind.

The result of this most remarkable and comprehensive theory was an extraordinary revolution in the ideas of almost all thinking observers; but, whatever its scientific interest, its moral aspect seemed ominous and repulsive. It appeared as though the Deity would be at length driven from all the spheres of scientific thought. No need henceforth of Him and His wise and adaptive foresight! The forces of nature would suffice for all. They could by slow changes adapt each species to its place, by the simplest physical necessity, by merely starving out and cutting off all that could not be so adapted. If so much could be accomplished by the simple agency of the slow and gradual operations of physical laws, why not more? Nay, why not the very development of life itself?—which many indeed began at length to say had in reality originated from brute matter alone: a suggestion, however, which finds no support in any of the grounds of observation on which the evolution theory is based.

We all remember with what strenuous resistance and what serious censure this whole theory was for a long time met and opposed. Nor, when we come to estimate the theistic bearing of these ideas, can a thoughtful mind be at all surprised at the hostile reception which the scheme encountered.

In the first place, though the doctrine of development did not directly assail, nor wholly abolish, the idea of a divine creation of the world of nature, yet it seemed to reduce the creative agency to an absolute minimum of reality. It taught that the animal whose alertness and grace of movement were so remarkable, the organ the adjustment of which struck us as so exact and admirable, had not been adapted by any constructive intelligence to the function which it so perfectly performed. The eye, for example, had not been fitted for its office by any intelligent design; it had acquired its present degree of perfection through ages of slow change and necessary progress,

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from a mere transparent jelly. Its apparent completeness had been attained by the simple dying off of all the individuals of less exact adaptation, until it had come to be the sole survivor of a multitude of eyes, the others of which were too imperfect to enable their possessors to live. Nowhere, in all the long process by which an organ had reached its finished form, was there any great or recognizable change which could be credited to the power and wisdom of a Divine Creator. The doctrine seemed to imply irresistibly that the world had had no all-wise designer. It had shaped itself to its present form by the necessary working of physical forces. It had deposited its strata, covered them with soil, and clothed itself with verdure and beauty, by the mere continuous operation of the powers of nature, without a break in the chain of physical causation which could be attributed to a higher power.

Next, not only had the theory of development reduced the creative agency to a minimum: it had, moreover, removed even this to the remotest conceivable period of time. Only at the beginning—itself a point beyond all possibility of clear recognition—was there any scope for a creative work. All subsequent changes, which were generally of the minutest kind, and often wholly imperceptible, were referred to the blind agencies of material nature alone. Only in the originating of germs did there seem to be any need or even any opportunity for the intervention of a creative hand, or the contrivance of a designing mind.

Surely it was by no means surprising that many resisted the establishment of such a theory, and cried out for some more rational construction of the grand universe of which our own intelligence is the noblest part.

And yet the theory must be acknowledged to be a most comprehensive and philosophical one; and, if it could be rescued from profane aspects and uses, a most interesting and beautiful one. It is, moreover, the only such theory that the ingenuity of speculation ever has framed or ever can frame. No other disputes with it the claim to be the only scientific and philosophical account of the formation of the universe. As such, we must say of it that it has a breadth of scope and a fulness of

application which are fast receiving the recognition of the world. That which has conquered its way to the general acquiescence of astronomers in the nebular hypothesis, and which has received the suffrages of all geologists in regard to the long periods and the uniform progress of the earth's physical history, can hardly fail to secure the world's acceptance of its truly philosophical account of the development of the organic beings of our globe.

Certainly no intellectual process could well be more interesting than that of tracing a clear connection through the whole series of changes by which, from the rudest and most elementary form of matter, this infinitely varied and beautiful world has become what it is. How delightful and how philosophical to take up the process in its very incipiency, when matter was "without form and void,"—a mere diffused and attenuated mist, utterly imperceptible to our human faculties,—to mark its advance from these ultimates, through their first humble aggregations, into those higher forms which we see and know as the familiar elements of our chemistry—carbon, silicium, oxygen, and the rest,—to witness the combination of these into the scoriæ and cinders of the early and heated state of the globe, and later into the rocks and sediments which have formed the strata of the earth; to trace the earliest beginnings of organic beings, as the creative power breathed life into the first lowly creatures that have left their scarcely recognizable traces in the Archæan rocks,—and see how from these, with constantly increasing diversification, form after form takes its place in the series, and type after type exhibits itself to us, till the waters swarm with elegant and graceful fishes, the air is vocal with the songs of birds of varied and bright plumage, and the whole body of the animal tribes in the forest and the desert at length complete the wonderful series and show us the whole great scheme of life in its orderly progress! Surely this is an intellectual marvel and charm, and the solution of the problem itself one of unfailing interest and delight.

Such, then, are the history and the results of one of the great scientific processes of our day, and such is the issue in the comprehensive doctrine of evolution.

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We must now, however, turn to notice another and a very different history, which will be found to modify these views, and to impose a construction of its own upon the theory and the issue above described. I refer to the scientific development in recent years of the physical doctrine of CORRELATION—otherwise known as the Conservation of Energy or the Persistence of Force.

All this time another process had been going on in the scientific mind with equal distinctness and equal force, in a very different, and apparently a very unrelated, sphere.

A new physical conception had taken the place of the old one. Men no longer spoke, when they had occasion to speak of the physical agencies of the universe, of fluids, as before. There was no longer a magnetic fluid and a caloric fluid; there was no longer a question whether electric phenomena were due to one fluid or to two. These were now recognized as *forces*, whose activities fill the world, and had shaped the forms and originated the phenomena of matter. All motions were now referred to the forces of nature, and these forces next became the subjects of scientific investigation. Each separate force began to be sharply distinguished from every other, and to be regarded as the source of a great body of events and aspects more or less noteworthy.

These results—generally forms of molecular motion—were all regarded as manifestations of force, and the force impelling the motions that formed the subject of inquiry, constituted the central point of the science. Each particular science became, therefore, an account of the action and manifestation of a specific and distinct force, having its own laws, and expressing itself in a peculiar series of phenomena.

In the origin of scientific research, each of these forces had to be separately investigated; the absence of any observable links of connection between them required us to conceive them as entirely distinct. No one of them seemed to imply any close relation to any other. But the time came when certain relations between one and another of them began to manifest themselves. It was early ascertained that the voltaic pile produced magnetic phenomena; and the result of this discovery was the identifi-

cation of the two forces as manifestations, varying with the varying conditions under which it is exercised, of a single force. Soon the identity thus established extended itself so as to embrace the phenomena of electricity proper; and these previously independent sciences of magnetism, electricity, and galvanism, or in its fuller form, voltaism, came to be regarded as essentially one, as did also the forces in which they appeared to originate. At this point the identifying process seemed for a time to be arrested; nor could the phenomena of the varying manifestations be further referred to a common cause.

Many years ago, Whewell, in his "History of the Inductive Sciences," recounted these earlier efforts, and remarked that the identification of the whole body of material forces would probably form the next great step in the progress of scientific philosophy. The result was by no means immediate, but the progress went on. Electricity revealed its power, under peculiar conditions, to effect chemical combinations and decompositions. The great step was thus taken of identifying voltaic electricity with the force that governs chemical combination, that is, with chemical affinity.

More recently, the advance of experimental research has disclosed a similar unity between forces that seemed yet more remote. Heat showed itself resolvable into a molecular motion in the particles of the heating or the heated body; and marked indications began to appear of a close relation between heat and electricity, which were expressed by the term thermo-electricity.

At length Faraday, calling Whewell to his aid, took up the subject for a careful investigation and determination of the question; and Tyndall, in his Life of Faraday, reports the character of his effort in the words which here follow. He seemed to ask himself, "Are there conclusive grounds for believing that the electricity of the machine, the pile, the gymnotus and torpedo, the magneto-electricity and thermo-electricity, are merely different manifestations of one and the same agent? To answer this question satisfactorily, he formally reviewed the knowledge of the day. He added to it new experiments of his own, and finally decided in favor of the Identity of the

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Electricities." His paper on this subject was read before the Royal Society in January, 1833.

The identity thus elaborately investigated and satisfactorily established, was so wide as to bring the electric force into very general relations with the other physical agencies of nature. So strong was the suggestion of the union of them all, that Faraday subsequently expressed himself in quite confident terms about it as an ascertained fact. He traces the union of these powers in these words, as quoted by Tyndall: "A few years ago magnetism was to us an occult power affecting only a few bodies. Now it is found to influence all bodies, and to possess the most intimate relations with electricity, heat, chemical action, light, crystallization, and through it, with the forces concerned in cohesion; and we may in the present state of things well feel urged to continue our labors, encouraged by the hope of bringing it into a bond of union with gravity itself."

The subsequent progress of this intimate research has contributed to bring these various powers yet more distinctly into relation with each other. All those forms of force which express themselves primarily by varieties of molecular motion, are found to sustain definite relations to mechanical motion, and to be convertible into it. Friction, arising from the mechanical motion of a mass, generates heat, which is a motion of the particles of the mass. If continued, it produces smoke—that is, it disintegrates the mass and liberates the particles from the cohesive attraction which held them; if still farther increased, this molecular motion generates flame, that is, light. A bullet fired against a wall is stopped; its motion as a mass is arrested, and upon examination it is found to be heated. The mechanical motion has become a molecular one, but the motion is not lost. Heat, light, magnetism, electricity, are all forms of molecular motion, and molecular motion is the antecedent or resultant of mechanical motion. Each is convertible into the other.

Still more recently, other and similar relations have been established between the remoter members of this great group of natural forces. The Photophone of Bell affords an audible demonstration of the intimate relations which exist between

light and sound. The impact of a beam of light upon a rubber disk, communicates to it vibrations which report themselves, not to the eye as light, but to the ear as sound; and even as I write, it is proposed to find the place of a bullet in the human body, by the audible sounds of an instrument of this kind held over it.

Not only is one of these forms of motion convertible into another, but the conversion is an exact and definite one of a precise quantity of motion. The amount of motion in any given manifestation of it is measured and estimated with all the exactness of arithmetic. When such a conversion has been effected, the precise quantity of the original is recovered in the converted form. The foot-pound affords a definite measure of the amount of any motor-force; and estimated in foot-pounds, the mechanical equivalent of any one of these forces is reproduced in every conversion of it into any other.

Such are the general conclusions of the physical philosophers who expound to us the natures and relations of these imponderable forces, and in these conclusions they have maintained a substantial agreement. The result is the general acceptance of the doctrine of the convertibility of the forces, and the belief that all forms of force in nature—of motor force, that is—are but related forms of a general and wide-spread energy, into which they are one and all convertible.

It is not for me either to affirm, or to deny, the accuracy of these determinations. If they seem to some a little doubtful, in view of the great complexity of a result into which so many minute and imperceptible forms of molecular action must enter, the presentation of the doubt may safely be left to the more sober and deliberate judgment of the physicist himself. When the excitement of so great and beautiful a discovery is over, he will not be slow to discern the defect of the evidence; and perhaps by that time he may have it in his power to supply the deficiency. For the present, and for our own part, we may be content to accept the alleged convertibility of these forms of motion and of these manifestations of force. The motions which form the subject-matter of the several physical sciences, however unlike in character, are only the varied expressions of

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a single comprehensive energy, acting under different circumstances and in different combinations.

The relations of this common and universal force have been traced by Mr. Herbert Spencer with great fulness and distinctness. The main point of his reasonings is that the several forces of nature are not individual and separate agencies, belonging to the particular bodies in which or through which they are disclosed to us; they are interchangeable manifestations of a universal energy which pervades space in every part, and exerts its influence upon the innumerable bodies that compose the universe. Each specific force is but a transformation of some other, or a modification of that which is the common ground of them all.

This general force is at all points of the universe absolutely the same. As it extends through all space, so it endures through all time. There never was a period when it began to be, and there never will be a time when it will come to an end. Like matter in the analysis of the chemist, force is indestructible. As the source of all movement or force in nature, it is forever incapable of any measure, estimate, or calculation; it is simply the original, inexhaustible, indestructible force of the universe. It is the sum of all that exists and acts; the one pervading, omnipresent, all-powerful, eternal—nay, that we are not permitted to say; but it is power without beginning, end, or change in amount. In other words, it is *the infinite*.

Thus viewed, the unitary force of nature is simply the all-pervading energy of what Mr. Spencer freely represents and designates as the "first cause." It is the real author of all movement and change in the physical universe; the true source and ground of all the phenomena of nature. The lightning and the thunder, the summer breeze and the wintry storm, the rays that gladden us in the morning, and the glow that charms us in the evening sky, all are alike manifestations of this one, universal, and primordial force.

It is carefully to be borne in mind that in thus conceiving of the forces of nature as phases of a single comprehensive energy, and of these endless differences of form as simply varying manifestations of this energy in action, I am not presenting any

religious or theistic construction of the facts of nature, but the generalization of scientific philosophy itself. These are simply the results of that great conclusion which affirms the correlation of the forces and the unification of nature. In maintaining that all the agencies of light, heat, magnetism, electricity, etc., are interchangeable forms of each other, or of some single comprehensive power that embraces them all, science has substantially taught us that no one of them is itself a substantive force, but that each is a modified form of the fundamental reality. Voltaism, for example, has no individual and distinct existence as a force, that might enable it to account for anything: it is but a transformation of electricity. Nor is the latter, any more than the former, a separate and distinct thing: it is only a modified form of chemical affinity. "The Voltaic wire," says Faraday, in one of his happiest generalizations, "carries chemical affinity." Electricity, too, is naught but a converted form of the heat-energy. Each is as evanescent a phase of the general activity of the world as the other; and no one is any more substantive or permanent than is that into which it is convertible.

But if these so different exhibitions of force are thus intimately related to each other—nay, are all thus identical with, and convertible into, each other—we can well understand and well believe that the other forms of the motor-agency of nature are equally so. All are but phases of the one great and persistent energy, which, as Mr. Spencer declares, is the infinite force. No manifestation, however distinguished in form from others, is anything more than a varied aspect of that which is their common basis—the illimitable nature-force which has fashioned the world. This is the comprehensive theory which, under the concurrent agency of Messrs. Spencer and Huxley, has shaped itself into the physical doctrine of the *persistence of force.* It proclaims to us that no force is ever lost; and that if it varies its aspect, or disappears from view, it is only to reappear in some other form which embodies and retains the exact amount of force that was present before the occurrence of the change. The original amount is identical, and is persistent under whatever transformations.

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A little reflection will enable us to perceive the relation of this theory to the teleological argument, as the complement and counteraction of the theory of evolution already discussed. It subsumes all the facts and phenomena under a precisely opposite principle or law. The dogma of the persistence of force is the counterpart of the dogma of evolution. If that removes all scope and all conception of a divine agency, to the remotest era of the past, this imports it again into our familiar life, and makes it vital and real where it had begun to seem shadowy and indistinct. If that reduces the creative agency to the most meagre dimensions, and assigns to it only the region of infinitesimal changes and mere minima of results, this enlarges it to a truly vast scope, and assigns to it a literally boundless extension. If the one regards it as an inappreciable and unnoticeable influence in the world's progress and development, the other esteems it an ever-present factor in every change—nay, the overwhelming reality which is the real factor of all the changes of nature. Instead, then, of being removed to a distance that would render him indistinct and small to our sight, the Creator is nearer and greater to us in this latter view than He ever was before. Instead of being separated from us by an extensive series of second causes, and of natural forces inherent in all the bodies with which we are conversant, and acting by methods of their own, He is Himself active and vital—nay, the only active and vital force—in things around us. The mighty energies of nature are but the manifestations of His infinite and ever-present power. He is more full and inexhaustible in the latter than in the former mode of conception. He becomes in the new view of the subject the moving force of nature, the very embodiment of all its energies.

He is more systematic and orderly too; as He works, however actively, through the settled methods of established and uniform law, and by all the minute gradations which mark the progress of nature's sequences.

He is, moreover, more comprehensive: there is no change, gradual or sudden—no movement, swift or slow,—which is not the result of His own activity, the expression of some varied form of His limitless energy.

The infinite is thus brought into the closest of all possible relations with the beings whom creative power has called into existence.

It is one of the most elementary and fundamental of all physical laws, that every action is followed by an equal reaction. Yes; but when you act, what, or who, is it that reacts against you. Is it simply a law or force of nature—cohesion, attraction, gravitation, or other? Nay, my friend, learn not by halves the great and significant truth which the science that you have so long loved and gloried in comes at length to teach you. The force that reacts to or against the acting of your own force, is, whatever its familiar name or its commonplace aspect, nothing less, nothing else, than the *force of the infinite!* Such it must be, for by the surest argument of scientific philosophy there is no other. Has not science taught us, with all the beauty and all the power with which she is capable of teaching anything, that each lower and more limited force is a manifestation, a phase, a form of that infinite and inexhaustible force "that fainteth not, neither is weary"? And if so, how can we refuse, and especially how can the scientist logically refuse, to recognize the fact that we stand thus face to face with a single ever-present, ever-active, and infinite power—One "in whom" literally "we live and move and have our being"?

The scientific scheme of thought is here brought into the closest harmony with the religious conception of nature. Each regards the material universe as simply one great effect or complex of effects, of the operations of an infinite force. The various powers or forces of nature, however distinct in their ordinary and regular manifestation, are, in strictness, scientifically conceived as phases or expressions of that great and pervading energy which fills all the space and controls all the matter of the universe. This ever-present, ever-active, all-powerful, and undecaying force, without beginning and without end, possesses in these characteristics the fundamental elements of the religious idea of an omnipresent, omnipotent, unchangeable, and eternal Creator and Ruler of the world.

This harmony of thought is the result of the general identification of the physical forces, now no longer regarded as separate

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and isolated powers, inhering each in some one or some few of the natural objects of our globe, but scientifically viewed as inter-dependent and inter-convertible operations of the infinite and universal force, and so identifying themselves with the creative workings of Him whom religion recognizes as the eternal Lord of the universe.

The scheme of thought which thus identifies the forces of the world with the activities of the First Cause, will at first strike many minds as standing in close relation with that pantheistic conception of the Deity into which philosophic thought has ever tended to run. The inquiry, therefore, will at once arise, "What security have we against this tendency to sink the distinguishing characteristics of the Deity in the mere qualities of matter?"

To this inquiry the answer is satisfactory and easy. But whether it is so or not, is of small account. We have no option as to our view of the subject. Again the fact must be noted that this is not a religious construction, but a purely philosophical statement, of the facts. It is not a theistic claim, but a scientific generalization, with which we are dealing. The forces of nature are one, and the movements of nature are the results and forms of its pervading activity. So science conceives it to be—a unitary force, moving and influencing all forms of matter, through the infinitely great and the infinitely small spaces, which it fills alike with its ceaseless and inexhaustible activity. This infinite force of the First Cause inevitably, we say, identifies itself with that which the religious mind has called God. Pantheistic or not in its tendency, such is the comprehensive fact; and it is with this comprehensive fact that we have to deal.

Whether or not the theory shall be pantheistic, depends upon our mode of looking at and receiving it. That it has no necessary relation to pantheism, will become evident at once when we compare it with the definition that Newton has left us to show his mode of conceiving things. The "laws of nature," he observes, "are the established methods of the divine acting." This is perhaps the noblest embodiment of Christian and scientific thought in a single sentence, ever uttered by a scientist;

and it expresses the conceptions of the present hour in the language of two hundred years ago. We cannot doubt that the world's greatest scientific observer and reasoner found it quite practicable to conceive the idea of a universal activity of the First Cause through general laws, without sacrificing or even endangering that conception of a personal Divine Ruler and a present Saviour, which he so truly loved and trusted in. Newton surely was no pantheist.

The only pantheism which we have to dread, consists in accommodating our idea of God to our conception of matter, and identifying the two as indistinguishable. If we can recognize in the First Cause a force capable only of mechanical aggregation and motion, and deny the possibility or the reality of any other or higher type of activity, we shall undoubtedly be compelled to give up all conceptions of a moral order of the world and a divine governor of the soul. But there is no necessity of such an identification. We are entirely at liberty to take our ideal of divine agency from that higher form of action of which our own minds furnish the type. We cannot indeed legitimately take it from anything else. We may conceive of the first cause as analogous to those second causes which are so familiarly known to us in our personal consciousness, and in our knowledge of our fellow-men. We are ourselves active beings, exercising force in the limited sphere of our own mental and physical organism, even as the First Cause exercises his infinite force in the realm of nature and through the kosmos. Such was evidently Newton's view, a conception in which the operations of nature, instead of being regarded as purely physical, were subordinated to the guiding intelligence and the free choice of an infinite and spiritual being. Such may be our conception, that of a force inhering, as all force must, in a substance, pervading the universe, operating in all the movements of matter, impressing the marks of its own clear intelligence and its own high design upon all nature's myriad changes, and ordaining the progress of them all, through whatever development, to some grand consummation. In such a view of the Creator, and of His relations to the universe, there need surely be no fear of pantheism.

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An important check to this full harmony of views is found in that assumed position of the agnostic school of philosophy which affirms that the human mind cannot attain to a knowledge of the infinite, and that all ideas of an infinite Creator and Ruler are hence impossible. This is the specific assertion of Mr. Herbert Spencer, adopted from the philosophy of Sir William Hamilton, who maintained that the infinite, not being a positive in thought, but purely negative—the non-finite—cannot be an object of philosophical knowledge. This idea, elaborated with all the great ingenuity and profundity of Hamilton, and illustrated with his almost boundless learning, made a strong impression on the thinkers of England generally; but upon Mr. Spencer, whose philosophy was then in a forming state, the impression was so strong that it swept him entirely away from the sounder foundation on which he had based his views when writing his earlier work on Social Statics.

The discussion which Spencer's irreligious application of this scheme called forth opened the eyes of many who had been at first disposed to follow Hamilton into the adoption of it. Not only has it failed to obtain support from any large body of careful thinkers, but the inconsistency involved in it has been so clearly pointed out, that the friends of Mr. Spencer are no longer willing to be held responsible for it.

The difficulty in sustaining Mr. Spencer's form of the agnostic doctrine arises from the fact that he himself ventures upon predicates which declare very fully the essential nature of the infinite. He pronounces it "a reality;" proclaims it "the fundamental verity;" declares it to be "co-ordinate with all orders of phenomena;" recognizes it as "the first cause," and "the infinite power," etc. Now when predicates embracing so many of the fundamental elements of human knowledge and thought are with the utmost distinctness, freedom, and confidence, applied to the comprehensive reality that we call the infinite, it is absurd to say that the infinite is unknowable.

If such distinct notions can be formed of it that we can call it a cause, a substance, a power, and can pronounce it active, vital, and productive of consequences; and if their reality can be so certainly known and so confidently asserted, we

surely must know something, and something moreover, very important and significant, about the infinite. So open does Mr. Spencer's argument lie to this decisive objection, that his American followers feel that all attempt to defend his agnosticism is futile. Accordingly it has been proclaimed in the *Popular Science Monthly*—the organ which has played so large a part in bringing his views before the American public—that the doctrine of the unknowableness of the infinite is not an essential part of Mr. Spencer's system. In this view we may perhaps be disposed to concur. The agnostic scheme, which cuts off the Creator from all possibility of being known by His creatures, is, after all, no fundamental postulate or profound principle of the philosophy which the system expounds. It is only an individual peculiarity of the founder, which, having ceased to command the respect even of his most devoted adherents, can interpose no obstacle to the reception of more devout and consistent views.

Mr. Spencer's incautious and free designations of the infinite as the "first cause" and "the infinite power" having exposed his argument to so conclusive a refutation, some of his followers have adopted a tone less frank and decided. They have sought safety in a greater reticence and indistinctness of speech. Mr. Tyndall, for instance, in speaking of the Infinite, says, "I will not call Him or it a cause or a power;" but mere blank silence is not philosophy. No one has more cordially accepted or more confidently taught the doctrine of the correlation of the forces, or done more to reduce the physical agencies of nature to a unity, than Mr. Tyndall himself; and his merely declining to pronounce the names which identify the powers of nature with the attributes of the great cause, serves but to show his sense of the weakness of the agnostic philosophy. If the forces of nature are fundamentally one, then every consequence which Mr. Spencer has so incautiously, indeed, but honestly and frankly recognized, inevitably follows. There is one great and universal force, of which those forces are manifestations and forms; and that universal force is none other than the creative power which has formed the earth and stretched out the heavens—the ever-present, the unchangeable, the unbeginning, the

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unending One, whom Christ taught His people to adore as the "Lord of heaven and earth."

The expansion which we have thus given to Mr. Spencer's idea of the primitive force, is indeed far from the religious conception of a Divine Author of nature. Mere power in whatever grandeur of extent is not, indeed, God; but it is the foundation of the religious conception, which needs for its support a Being of infinite attributes. A wisdom that is unsearchable, a knowledge all-embracing, a power of unlimited reach and irresistible might, a presence all-pervading, an eye to which the darkness and the light are both alike—these are what the theist has been wont to ascribe to God as His natural attributes. Beyond these we need to know Him as a being of goodness, holiness, justice, and love, equally infinite, before the soul can recognize Him and worship Him as God. The proof of these qualities must be sought, as we seek the proof of the goodness and justice and love of a fellow-man, in His works. Here it is that the teleological argument, so long maintained and so elaborately illustrated by our theistic writers, asserts its force. We see proofs of intelligence in the varied and numerous adjustments and collocations of organs in the animal world. The eye, the ear, the hand, the foot, each displays purpose and intelligence in its minute and elegant adjustments. Every bone and joint, each tendon and tissue, has adaptations and correlations which interpret and commend it to us as a work of order, intelligence, and design. Each lower field, each larger and higher sphere, is alike full of such manifestations, till the mind, overcome with the variety and multitude of the phenomena expressive of the creative goodness and wisdom, exclaims as it looks up to heaven, "The whole earth is full of Thy glory!"

Into the reasonings which would defend and vindicate these views we cannot here enter. A volume would be required for their elucidation. All that can here be done is to indicate the direction and path of the argument, and to show by what steps we may pass from the grand but barren conception of the infinite force, to that of an intelligent author of nature, and still onward from this to the idea of a moral order in the universe and a moral governor of the soul and of the world.

The further, and especially the complete, elucidation of the subject were an enterprise worthy of the highest powers in their best endeavor. In expressing the hope that on some future occasion I may return to it with wider scope of argument than an hour's lecture can furnish room for, I only give utterance to the hope and the prayer of a lifetime devoted largely to this momentous theme, which here and now I can but commend to the diligent research and devout thought of my hearers.

Such, then, is the general result of scientific investigation and reasoning in that fruitful period through which our age has been passing, and such is the bearing of its grand generalizations of the doctrines of evolution on the one hand, and the persistence of force on the other, upon the great argument from design in nature.

If a scientific view of the world discloses, as the essential characteristic of nature, the operation of physical forces through long ages of time and in accordance with general laws, these physical forces at the next step of scientific progress resolve themselves into manifestations of the one universal and infinite force. If the facts suggest powerfully the progress of geological and biological changes through minute and regular gradations, these gradations themselves have to be viewed as the uniform and systematic procedures of the one all-producing and original cause. Thus the Omnipotent Creator vindicates Himself in the very field in which his action seemed to be most successfully disputed. The Great Author claims His own work; and science finds herself constrained, and we must hope not unwilling, to recognize the claim which her proudest and grandest generalizations make.

If she has not yet learned to bow in reverence before the Great One whose footsteps she has so distinctly traced, we must remember that she has learned her great lesson as yet but recently, and hence but imperfectly. Her eyes have been opened hitherto only in part, and she sees men as trees walking. Let us hope that here, as elsewhere in nature, the happy progress will complete itself, and that when she looks again she will see all things plainly. Sooner or later she will come to know in

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what manner of being this infinite force inheres, what are the laws and the methods of its working, and by what marvellous and pervading agency it is that part connects itself with part and atom answers to atom, through the boundless spaces of the "infinite azure." 'How is it,' says Sir John Herschel in his dialogue upon Atoms, 'that atom responds to atom so promptly and so accurately across the spaces of the universe? There must be great presence of mind among them.' "Exactly so," says the other speaker, "you have said it. It is the presence of mind in nature that explains everything."

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THE BIBLE AS A FINAL AUTHORITY FOR RELIGIOUS TRUTH.

[A Paper read before the American Institute of Christian Philosophy, 30th March, 1882.]

By Rev. S. S. Martyn.

WHEN the Bible speaks to us, what authority shall it have? How far shall we heed it as the voice of God revealing His will to us; to what extent regard it as law for the upbuilding of society; how far as truth touching the origin and destiny of man, and incidentally the order of the universe? This is the kind of questions especially thronging upon us in these hours. Possibly the New Version, after the ten years' arduous labors of the Revisionists, has awakened new interest in them and called attention afresh to their importance. However this may be, the forces to-day, if we may trust the signs of the times, are marshalling for conflict upon the *nature and reach of the Sacred Word itself:* whether possibly we possess a Bible at all, so that it really amounts to anything as a sufficient rule of faith and practice.

It is not the intention in this paper to contend for technical words or phrases, or to make the argument along that line. Such terms may indeed naturally come into use in any fair discussion of the subject; yet what we want is not words but the *truth*, reached also in that way, if we can find it, which best gets at the heart of the matter. Whether "infallible," or "inspiration," or any other word reaches that end or not, there is some way that does, and that way be it ours in this discussion to seek.

As we approach a consideration of the subject we are met in the outset by the insufficiency of any method of investigation

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which seeks to account for or explain the Bible on distinctively naturalistic principles, principles that make it a natural development. They are inadequate for the simple reason, were there no other, that the phenomena to be tested or explained pertain to things beyond nature. We are all more or less familiar with such methods, especially as seen in what may be called their grosser forms, such as the mythical theory of Strauss or the tradition theory of Renan or the accommodation theory of Baur and the Tübingen school which makes Jesus and the disciples and sacred writers accommodate themselves, so to speak, to a kind of "pious frauds." But Max Müller unconsciously furnishes a very suggestive illustration of the insufficiency of such a method as applied to the whole question of religious beliefs, in his subtle article or lecture on "The Philosophy of Mythology," in the fifth volume of his "Chips from a German Workshop," where he applies it to the mythologies of Greece and other nations. With that learning of which he is master, though with generalizations and conclusions not so satisfactory, and with the tendency characteristic of him to seek in the roots of human speech, which are common to representative divisions of the human family, the germs of unfolding civilization, he makes such roots, as they take on their different additions and prefixes and changes, not only the way in which religious or at least mythological beliefs grow up—for he does not make all mythologies religious—but also authoritative in fixing and even in creating the general character of a people's belief in or use of its deities. The history of a people's language in these earlier stages of linguistic growth is the history of the origin and development of that people's religion. He sketches the growth and significance of the names given to objects and phenomena of nature, such as sun and moon, or the dawning of day, or the process of breathing, and shows how Jove was the result, or how the conception grew up of a spirit in man as "the incorporeal, the immaterial, the undecaying, the immortal part of him—his soul, his mind, his self."

Does such a theory, can it, account for the Hebrews' conception taking to itself form not in legends and statues as in Greece and Rome, or in metaphysical distinctions as in Brahminism, but in the laws of Moses and the theocracy of the

Jews? Does it or can it give an intelligible theory of the growth of the religious idea among that people and through that idea the growth of the Bible? Possibly, were it indeed really sufficient to explain why thus inevitably language should take on in the outset, and also keep up, the religious type. Müller himself in his exhaustive essay on "Semitic Monotheism," vol. i. of the same series, in which he combats Renan's explanation of the Jewish belief in God as a special religious instinct, makes the religious nature of man part of his original endowment. But his theory of the growth and nature of mythology shows none the less how such a kind of method in the interest of accounting on natural principles for religious phenomena would if applied to the Bible land us nowhere, or reduce the Bible to a mere shadow of something apparently real but with no actual reality behind it, while yet all its religious elements remained unexplained.

There is in this connection a higher manifestation of this philosophical naturalism as applied to the teaching of the Bible, namely, Arnold's ethical conception that the God of the Old Testament is a moral personification; Right, Truth, Justice, a moral order of things, each and all made a grand, all-central personality. But that conception also, lofty as it is as an ideal, is nevertheless insufficient, not only because it is an assumption that cannot be proved, but because it yet fails adequately to account for the growth not of the ethical but of the *religious* spirit. The witness may be honest, but he is not competent.

The problem thus remains unsolved; the use of a philosophical naturalism, as the generically true or sound test, is not a safe one. Anything, also, based essentially upon that test may justly be criticised as faulty and inadequate.

Coming next to more distinctively or professedly Christian methods of investigation, certain later representative phases especially attract our careful notice. For instance, in the January number of the *New Englander* there is an article calling in question the infallibility of the Bible, and written by Rev. J. M. Whiton, Ph.D., whose accuracy of scholarship the writer of these lines has long respected since he sat a learner at his feet in the old days of college preparation, and whose friendship is a thing he yet holds dear. Like everything from

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the pen of this gifted author, the article is terse, strong, and, from his standpoint, well put. It argues that the infallibility claimed for the Scriptures is a bane, necessitating so much scholarship in order to interpret the meaning, so much overloading of argument, so much explanation of errors which cannot be explained, so much answering of objections which cannot be answered, that an infallible mind is needed to interpret it. He would therefore give us a sufficient but not infallible Bible; sufficient for appealing to the *conscience* and finding therein a response in things essential to true and right living; but not infallible, not coming to us without defect or error. The Bible would indeed need an infallible mind to interpret it, and thus accurately and authoritatively fathom it. But is that necessarily its defect? Nay, is it not rather its glory? And is the objection, therefore, altogether a valid one, that the Bible cannot be infallible because a fallible mind cannot interpret it? Pointing out its positive errors and showing them to be fatal defects is one thing; turning the argument on its infallibility because a fallible mind cannot master it is quite another. But an infallible help is especially provided for in the operations of the Holy Ghost, promised as a gift of guidance unto the heart that, living in the Bible-way, asks for it. "But when the Comforter is come" (or "Helper," as the margin of the Revision has it) "whom I will send unto you from the Father, the Spirit of truth, *he* shall bear witness of me;" and again, "When he, the Spirit of truth, is come, *he* shall guide you into all the truth."

But it may still be said, "If the Bible, nevertheless, were really infallible, there would be no errors in it." Errors as to what? Professor Fisher's view seems more satisfactory here, appearing in his late article in the *North American Review* on "The Christian Religion," where he suggests and argues that these apparent defects and real difficulties may be in general satisfactorily explained if we take into account the gradual nature of the Divine training and special preparation leading up to Christ, and the corresponding nature of the revelation given —successively given and not necessarily perfect in all its parts, but growing out of human needs and weakness and conditions, and out of the corresponding adaptation of the Divine mind to

those needs and conditions, until the consummation in Jesus. Possibly, however, it may here be objected that this explanation places the whole question in the category of the philosophical naturalism already considered, thus making the Bible like anything else, a thing of merely natural growth or development, and thus virtually destroying its supernatural character and authority. Such a conclusion, however, does not necessarily follow. The revelation may be a personal guidance and developing care on the part of God, given in a special divine manner to his agents in the matter, as a guide or voice or law for all time, while yet it is a gradual development. And as such, too, it might be substantially infallible while yet not free from defects and errors. Doubtless there are errors, at least locally, so to speak; but the vital question is whether they are germane to the whole reach of the work, whether they may not be errors possibly, as the scaffolding of a house might be an error in matter of beauty, or expense, or fact of height a foot or so, or even of safety; yet such defective scaffolding would not destroy the infallibility of the house as a strong, safe house built upon the rock to withstand the storms, and thus adapted to its purpose. This point, also, is more specifically met by Professor Fisher in his "Essays on the Supernatural Origin of Christianity," chap. i, where he considers the question of inspiration. He sets forth the argument of Dr. Arnold that the anticipatory error concerning the near second personal coming of Christ, on the part of the disciples does not of necessity weaken the authority of the revelation as essentially free from error, since Jesus taught that the matter was not one of revelation, and Paul expressly claims that he does not speak with authority on that point. Dr. Rothe, of Heidelberg, is also quoted to the effect that the human element or factor in the composition of the Scriptures might admit of errors in physical science and history, and on the part of the apostles of mistakes in reasoning and in their method of interpreting the Old Testament, while yet the Bible as a self-explaining, self-regulating book still remained as the source of knowledge in faith, with its authority intact. Coleridge in like manner is also quoted as saying "that it is the spirit of the Bible, and not the detached words and sentences, that is infallible and absolute." Prof.

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Fisher's own summing up is to the effect that profound theologians even among the most liberal of evangelical believers thus feel held to the "Protestant doctrine of an objective and, on the whole, unerring standard of religious truth and duty."

This is certainly very different from holding to the Scriptures simply as "a safe and sufficient rule of faith and practice." And it may be fairly asked whether all the conditions involved do not *demand* some answering reality beyond that, even some such statement as that of Professor Fisher, unless indeed we are to give up the Bible altogether as a special revelation. Such views may perhaps be the much unfortunate learning or overloading deprecated by Dr. Whiton as necessitated to bolster up the doctrine of infallibility; but is that, after all, any valid objection? Why not throw away the Gospels because they have required so much discussion and learning to bolster up their genuineness and authenticity. It is one of the characteristics of the Constitution of the United States, that the finest minds have brought the nicest discriminations and the most varied learning to its testing, and that it is loaded down with the most subtle decisions essential to its proper understanding. Does that weaken its authority as, so far as the organic law of the land is concerned, infallible?

Possibly Dr. Whiton's appeal to conscience as the adequate test, the final court or court of appeals, covers this whole point. Perfect and authoritative truth is, he claims, within our reach, and also "must be reached by conscience, the moral reason demanding moral truth as its natural element." But, like a watch, conscience needs a regulator. It has often been guilty of gravest excesses. Error as well as truth has not seldom commanded it. And in point of fact, although it signifies that part of man which holds him to a moral order, judging him in his individual moral acts or states, and pronouncing the verdict "Guilty" or "Innocent," it is yet by no means the same as the measure of religious, spiritual, or other truth. "God is *Love*," the Bible teaches; Father as well as Judge. *Love* "is the fulfilment of the law," it proclaims. It also says, "The righteous shall live by *faith*." There is a praying nature, to which it also promises its fullest revelations. Throughout the universe it is Love which is on the throne. Nor is this mere sentiment. The

richest blessings to man flow through that channel, the holiest relationships of life are made possible and secured by it. Love, faith, prayer—these are as essential facts in the highest development of man's nature, as distinctive avenues of the highest, holiest operation of things, as conscience. And shall these divine realities have no corresponding testings of their own? "Yes," would reply the doctor: "a *right* heart." True, conscience must have a place there. But so, too, a right *sensibility;* affection, not duty simply—the *heart*. *There* speaks the divine word. "Oh, how I *love* Thy law!" exclaims the Psalmist.

All this proves that truth does not make its highest revelations or speak its supreme will to conscience alone, and that even conscience may be so out of order as to need to be righted. That the Bible is able, especially through Christ, thus to command conscience, to give it quicker response, wider range, and clearer vision to discover the right, does indeed thus far prove its infallibility. This is conceded by Dr. Whiton, and shows that the pivotal point of his argument, the appeal to conscience, so far from disproving the infallibility of the Bible, really proves it in the particular wherein it is actually applied, namely, the character of Christ. Let us not throw conscience overboard. Any philosophy that does so must come to grief in the end. At the same time, does not what we have considered show that applied as a test to the full divine power and the filling in that may belong to the Bible, it is incomplete and inadequate, with the tendency, if too literally or closely pressed, to unduly exalt the distinctively human side of the question, the side to which conscience belongs, whereas the very thing the Bible assumes to do is to review, direct, control, make over the human side? Jesus' own words are, "Ye must be born again."

But to pass on: We also have what, for brevity's sake, we may call the subjective-historical test of Professor Robertson Smith, as put forth in his recent work on "The Old Testament in the Jewish Church," Lect. I. "The actual value of the Bible as the manual of the spiritual life," he says, "lies in the fact that it is the mirror of all normal religious experience." This "human side," as he terms it, is, he claims, actually essential to a full understanding of the Bible, and he explains it further along as follows:

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"The prophets and psalmists were not mere passive channels through whose lips or pens God poured forth an abstract doctrine. He spoke not only through, but to them and in them. They had an intelligent share in the divine converse with them; and we can no more understand the Divine Will without taking them into account, than we can understand a human conversation without taking into account both interlocutors."

He insists that a sound understanding of Scripture is to get into full recognition and appreciation of this human side. It is, he claims, the whole business of scholarly exegesis. And he adds:

"All that earthly study and research can do for the reader of Scripture is to put him in the position of the man to whose heart God first spoke. What is more lies beyond our wisdom. It is only the Spirit of God which can make the word a living word to our hearts as it was to the hearts of those who first heard it."

The other name he gives to this method or principle of study, a method which he claims is at once the Protestant principle of the Reformation and the critical method, is historical criticism, historical study, appreciation, and research.

But if we *don't* live over again that life they lived, what real force then has the sacred story? It mirrors nothing in such a case. But shall it for that reason have no weight with us, must we fail to appreciate it, or are we at liberty to ignore it? What we want to know is, to what extent the Bible is the voice of God speaking authoritatively and directly to men for all time, and how we shall test that question; and we are told in reply: "Mirror the life of the times of which it treats, and live over that life, and to the extent that you do this you will know!" Doubtless a deep truth is touched here. Common experiences do indeed make "the whole world kin," and help unravel the great mysteries of life and learn its lessons better. No true history of any people or time can be written which ignores this fact. And it must be a test having its place in any true historical treatment of the Bible; but only, however, within certain limits. For is it, after all, possible for any one really to reproduce the circumstances surrounding another, repeat another's life, actually fit into another's experiences? And can it there-

fore be essentially true that we must reproduce the Bible-life in order to share the benefits of the Bible itself or before we can know its truths or come under obligation to its appeals?

Our author's theory may thus be valuable as a grand idealism, but we may fairly ask whether it does not break down in the very first attempt to make practical use of it? It may serve as a quickening of faith by bringing us into closer sympathy with those who were once sharers in our common humanity, who lived their life in those times, and enabling us the better to make use of them as "a cloud of witnesses" compassing us about; but as an adequate handling of the Scriptures as the Word of God, or as a sufficient testing of it as that Word, it halts. And if we are to make use of it as such, then the vital question arises, Why may not God speak even in more fitting or satisfactory ways to men of wider outreach of possibilities, if not wider mental and moral scope, to-day, and thus give a continuous Bible, or a system of things wherein we are continually finding newer and more varied experiences,—that is, leaving us with the old Bible virtually obsolete, and thus really no Bible? Professor Robertson Smith writes in the interest of a devout and at the same time Christian intelligent criticism and research; and while we may not assert that his theory does in fact thus drift away from the supernatural, yet that it really makes room for the Bible as ultimate authority and not something dependent upon the state of one's own mind, or at least affords any true testing of its teachings and scope, we may well doubt.

And yet there can be no vital objection to a thorough testing of the authenticity and genuineness of the books of the Bible, or to a right appreciation of all the surrounding circumstances if we can learn them. There can be no objection to the testing of all this in the same way as we test all books, namely, by evidence, by historical research, by careful exegesis, according to the laws of language and the comparing of documents bearing on the case; provided always—and so far Professor Robertson Smith's test finds a legitimate application—we get into the spirit of the book, but into the spirit also—and here we go beyond him—not so much because it meets the test of our researches, as because we respond to the life, power, thought, feeling, in a word, Divinity, that may be in it. If possibly a

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rationalistic criticism like that of the Tübingen school, contributing so much at least that *is* rational, has driven us to emphasize, more than was formerly the wont, this historical sifting and testing, let us be thankful. It is Terra Firma.

In this same connection we are met by the view which would hold on to a living personal Christ as the only real authority, with the Scriptures but the framework, so to speak, of the picture. Dr. Whiton, in making, as we have seen, the character of Christ discover to conscience the divine authority that was in him, makes use of this view. Professor Stearns, in his inaugural address last summer upon "Reconstruction in Theology," on the occasion of his assuming the Chair of Sacred Theology at Bangor Seminary, especially makes it the basis of his argument; and Rev. Alexander McKenzie, D.D., of Cambridge, Mass., in an elaborate paper read last December before the Ministers' Meeting of Boston on "The Final Authority," and printed in the *Congregationalist* of January 18th following, with great urgency also presses it. Professor Stearns' address appears in the same number of the *New Englander* as does Dr. Whiton's article already referred to.

Here, too, is a great truth. Christ *is* the "infallible authority" as Professor Stearns so forcibly expresses it. But when he says, "The Scriptures contain this divine authority, but are not of it," when he asserts that "The Scriptures are the setting, but not the jewel," does he not go too far? Why not rather an essential part of the picture itself; coloring, background, the divine voice speaking, the divine life in Jesus taking shape, the whole more than a jewel, even a divine creation with Christ himself the Soul of it all? And when Dr. McKenzie says, "What I mean by the final authority is nothing less than Christ himself," is he not indulging in a rhetorical figment? Who does *not* believe in Christ as the final authority—at least what Christian believer? The question is not what shall we do with Christ, but what shall we do with the Bible? The Divinity that was in Jesus was truly Divine Love, Divine Purity, Divine Rectitude, in a word Divine Truth; the whole embodied in him and impressing itself on all around. But then is there not something more definite than that kind of embodiment of final authority needed as requisite to set it forth, as enabling us to

know and respond to its conditions? Something, too, as an essential, working part of the whole body of truth coming through Jesus? That extra something the Bible reveals. In other words, what, aside from the Bible, do I know about Christ? They both stand together, the Bible with Christ, Christ with the Bible: not because the Bible simply as a history sets forth Christ's life, but because in Christ it proves itself the special revelation of God to the race, instructing it, warning it, re-creating it, telling it how to walk, how to pray, how to be at peace with God; revealing, as parts of the system of which Christ is the type and soul, man's origin, his fall, his recovery, his heaven both here and hereafter. The final authority is thus Christ, and all that as an integral, essential part of the whole revelation of which Christ is the centre leads up to and flows from him. *That* makes the Bible. It *is* the Bible. It constitutes it the Sacred Book, the Book of Life, Duty, and Spiritual Truth, and all other truth so far as it sustains any kind of relation to spiritual truth. And to talk about Christ as the final authority, with the Bible only as the setting of the jewel, is like talking of the individual as authority in our civil system, and the Declaration of Independence, the Constitution of the United States, and the whole machinery of Government only as the setting. The authority is lodged in the whole political system; it cannot be administered in any other way; is not authority otherwise.

Turning now from the consideration of these and similar views, we behold one peculiarity especially characteristic of the Bible, namely, its adaptation to the deepest wants of human nature. It comes to man in his deepest need, and meets it. It finds him in his weakness, his struggles, his aspirations, his cravings after immortality, and brings a succor adapted to these different phases of his need.

And here we meet the exigency of sin—time's unchanging tragedy; a universal moral disturbance and undoing; a viation of that endowment in man which breathes its native air in the region where right and wrong are living realities, and love to God and man the other answering part of the highest order of things; a condition before God and Eternal Rectitude of wrong-doing and condemnation, and which is the prolific source of crime and woe on every side. Any view which ignores or be-

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littles or subordinates this exigency, and not only the logical credibility, but also the necessity on its basis of an operation of things like that centering in Jesus, who was revealed to take away our sin, to create us to new life, to put within us the germinal principle of divine life, and give human possibilities their highest wing, must so far prove fatal as any true philosophy of human nature or correct painting of human history, and especially as an adequate testing in investigations like that before us; for it ignores the facts, fails to explain Jesus, or to give any commensurate idea of the working and meaning of the revelation which with Him as the centre we call the Sacred Word. It also fails to explain the gospel system, based on regenerating love, and the dominant fact in civilization to-day. Here is our Gibraltar. Here we must sooner or later come in our examination. Here man's needs centre, in this great spiritual need. The Bible finds him there and brings adequate help. The revelation and the needs are congruous with each other, and congruous with the entire system we call Christian civilization.

It may possibly be said here, that the Bible does not meet all men in their needs; it does not meet the Brahminist in his. He turns to the Veda, *his* Bible, for that. But that help has not worked as a great saving, uplifting factor in human affairs as has the Bible; has not given scope to human development as has the Bible; has not come with a merciful healing for sin as has the Bible; a healing which, when applied, has brought out the noblest powers in man. When we speak also of needs, they must not be surface needs. They must be needs in all the depths of human nature. And using that test, the question is not so much whether the Brahmin responds to the Bible as whether he really responds to his needs, wakes to his own possibilities. I may feed on a low diet. My neighbor may feed on one more wholesome and better fitted for a healthful development. I may like my diet the best. That does not alter the fact that the other is better adapted to my needs, or that if I will feed on it I shall be stronger and healthier. The drunkard may say that water does not find him in his needs; but the trouble is with the drunkard. Put Christian and Brahminist side by side in their normal state, or apart from special circum-

stances of birth and training, and bring the two systems to bear; which would better fit in with the deepest wants of either then? Can there be any doubt in a land of Christian freedom, of the opportunity afforded for the fullest development, of the Christian home, of the elevation of woman, of free schools, of a free press, free speech, free thought, of the worth put upon the individual, and the dignity added to human nature? And this is no reflection upon the Brahminist. His personal worth may be as great as the Christian's, his human nature as good; but the system under which the Christian is reared is higher than his, meets more the possibilities of the race, touches more the needs of the human heart, brings a kindlier, more helpful, and more hopeful renovation to bear upon mankind. And all this is but simple recognition of the fact of that something the Christian calls the divine spark in Jesus, which constituted him what he was, and which, Dr. Bushnell so well shows in his "Nature and the Supernatural," explains his more than human development. It is simple recognition of the explanation the Bible gives of the fact, as signifying the highest manifestation of God to man, that we too may be made partakers in like manner, as we are not otherwise, of the divine nature. That is the revelation: a revelation of divine mercy and helpfulness adequate to the emergency, and adapted to the emergency; fitting the soul's deepest needs. It is a fact; as much so as the law of gravitation, or Kepler's laws of the movements of the planets in their orbits. It is tested as they are tested—by the results. And coming as such a fact, such a revelation, it comes as the highest of all facts, the highest of working forces in human affairs, the crowning fact of history, and with an all-commanding force giving it a right to be heard. It is for us to heed and accept; if we do not, *we* suffer, not the revelation. It is *the* Revelation—ours to live by and die by, as the way to abiding fulness of life for evermore.

To gather up, then:

First. Two distinct lines of investigation for the testing of the Bible as authority present themselves to us. The one is along the distinctively philosophical, naturalistic line, accounting for the Bible as a thing of natural growth, an incident of human development, and having just as much weight, as it is a

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record of facts coming within the usual orderings of nature, or as reason may see fit to give to it otherwise, but not as the voice of God especially proclaiming His will and way, sounding throughout the ages, and still as of old speaking, "Be still, and know that I am God."

The other line of approach is that which starts with *God* speaking to the soul, and then builds up theories with that sunlight lighting up the dark places; which, starting from the pivotal point of man's sinfulness, and God's scheme of recovery through Christ, makes the word not merely a record of that scheme of grace, but an integral part of the whole revelation, so that it not only sets forth "the way, the truth, and the life," but proclaims it with *authority*, as the law-book sets forth the will of the law-making power, or as a will contains the last testament of the testator, or as a letter conveys to a son the care, thoughtfulness, and wish of a loving father. As the other is the naturalistic method, so this is the supernatural faith theory, speaking in a way fitted to account for the facts, and coming to man in his deepest needs.

Among the latest phases of Christian scholarship there also seems to be a marked tendency to give to the Bible a distinctively historical character, or trace it as a distinctively historical development, making the Biblical events with Jesus as the centre speak as any events may speak and be tested as a story or narrative, and subordinating all the elements so as to make them fit in here. That this involves or is an undue tendency towards the philosophical naturalism considered, has not been asserted, and is not here charged. But whether by unduly exalting the human side in the investigation, by bringing to bear tests that remain satisfied with a distinctively historical treatment, it does not also unduly limit the essential, supernatural character of the whole revelation, or so separate and confuse the elements involved as to remain an insufficient, if not destructive test of its reach and scope, may be seriously doubted.

And here a question meets us; not an assertion, but a question. While there is this tendency, so marked, to approach the Bible along its distinctively historical side, is there not also a tendency towards the letting down of spiritual life, apparent

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in many marked features among us? Another question also arises: Is it not on the other hand true, that those who use the Bible in the most literal sense of the faith-theory set forth, like a Moody and a Pentecost, find their preaching attended by a marked toning up of the spiritual nature and of conscience? Are not these questions worth considering? Is there no significance in them?

Gathering up still further:

Second. We are confronted by a *fact;* namely, that we have or share a system which has come down from the ages, which has been a creative power, renovating, purifying, changing the world's course to loftier and more God-like ideals and standards. This system is a fact, and the Bible is part of it.

With the open Bible came modern liberty. When the Bible, no longer locked up in convents and tongue-tied by a dead language, made its advent among the affairs of Europe, the knell of despotism was struck and chains began to fall. The story of the conflict in behalf of a free Bible is the story of the beginning of the struggle for individual rights. That chapter of history has lately been written by Coffin, in his "Story of Liberty," with a fresh and thrilling pathos. A free Bible and the free civilization of the present began their career together.

In his Life of himself, Frederick Douglass tells us how, when his mistress was teaching him his letters in the darkness of his slave-boy days, that he might learn to read the Bible, his master forbade it with the remark, "If he learns to read the Bible, it will unfit him to be a slave." "And as I read," continues Mr. Douglass further along, "behold! the very discontent so graphically portrayed by Master Hugh had come upon me. Light had penetrated the moral dungeon where I had lain. The revelation haunted me, stung me, and made me gloomy and miserable. As I writhed under the sting and torment of the knowledge, I almost envied my fellow-slaves their stupid indifference." In describing his conversion, and his attendant growing thirst for freedom, he adds: "My desire to learn increased, and especially did I want a thorough acquaintance with the contents of the Bible. I have gathered scattered pages of the Bible from the filthy street-gutters, and washed and dried them, that in moments of leisure I might get a word or two of wis-

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dom from them." And as thus the slave found his love of freedom fed by his study of the Bible, so ever, where the Bible has had freest way, freedom has most increased.

The system thus signified is also the type of the highest soul-life. Whatever imperfect devotees may have sought to infuse into it, securing thereby bigotry, violence, and persecution in return, that notwithstanding which has come out of it is the Genius of Divinity; a genius ever stamping itself more and more in enduring shape, and in fairer lines of beauty, on all around. This fact confronts us. It is explained by the corresponding fact that the Bible finds man in his deepest needs, and meets them. So the Bible *has* spoken. So it has found its way into multitudes of homes. So it has recreated dead souls, or been the means whereby the regeneration was brought to bear. So it has strengthened the tempted, stayed the troubled, ministered at the death-bed, and brought consolation at the open grave. So under it abuses have declined, and righteousness most abounded. The system and this working of the Bible are congruous with each other—both together constituting the great fact that meets us.

We have a right to say, therefore, that while the system lives, the Bible also lives as part of the authority inherent in that system; lives still to do its work of helpfulness and cheer. Its authority is in what it does; and as what it does pertains as a creative power to the highest verities of human experience, and controls them, so its authority in all things entering that sphere is absolute and final.

Gathering up still further:

Third. The best proof of the Bible is in its *use.* If it be said that this kind of testing may do for the devout, or for those inclined to accept its teachings, but not as serving to convince others, then there still remains the presence of the Bible with its supernatural features, and its adaptation to the deepest needs of the human heart, as the great central fact of history confronting us. And the correlative fact also remains, that those who have tried it most have proved it most. Those who have made largest use of it for their healing and the inspiration of their noblest living, have come to have widest knowledge of its scope and power. In other words, the best proof of the

Bible thus comes from the Bible itself outward to man, not from man inward to the Bible, not as dialectics or mere argument. It *will* be argument, however, argument on the facts, argument on the use. It will be proof, as the fact that it is the nature of love to sway the human heart is best proved by opening the heart and letting love come in and do its work. True, there are difficulties; difficulties of harmony, chronology, authenticity, purity of the text; difficulties in the narrative itself—what place it ought to hold as fact, and so on. Circumstances might render it necessary in some specific case to go into a critical study of them; and then the study should be made thorough, but most assuredly not to the belittling of the word as authority, because they are there. Beginning in that way to prove its authority, or to destroy or limit its authority, will accomplish neither purpose. The question still turns on the scope, and only secondarily on the filling in. So with the miracles: fitting in their places as parts, and homogeneous parts, of the whole, they are appropriate then. But to start with them as mere facts, either as proving or disproving the supernatural character of the revelation, is idle. The proof is not along that line. Alone as facts they would stand incredible; as the working of the entire wonderful, beneficent system, they become natural and reasonable. Use the system; then let them come in, and a devout faith will also come to see how poorly it can do without them, how they round out, strengthen the whole revelation.

A reverent understanding need be in no hurry to magnify the difficulties in the Word of God. It will neither shun them nor hunt them out. It will *use* the Word itself, difficulties and all, just as they come, and not think it necessary either to explain them away, or because they are there read that part out of existence. And thus by trying the Bible as one tries a cup of water for the quenching of thirst, by using it, it will let the Sacred Scriptures make their own showing in their own way.

Gathering up once more and finally:

Fourth. On the whole, then, we may stand on the Bible as a full and sufficient, as the final authority for religious truth. There are other sources, but this ranks them all. When it says, "Ask and ye shall receive," we may believe it; and believe that

it means, too, for us to live in that way—not as indeed living in idleness on God's bounty, for it also says: "If any will not work, neither let him eat;" but as stewards for God, as in his service, as his child taking counsel of him. It is a Word to live and die by, in loving acceptance, obedience, and trust, through the enlightenment and guidance of the Holy Ghost. Here as Christians, ministers, and scholars we may stand, and lead those under our influence to stand.

Two scenes were prominent at the Centennial Exposition. One was the Chinese department with its little cabinets and their drawers, each requiring the utmost skill and labor to construct them, yet of little practical moment when constructed. A first visit to the Exposition soon after the opening rendered the spot especially unique. There the attendants would stand and with delicate fingers take out the drawers, lovingly handle and dust them, and put them back again in their places, as a little girl washes and dresses her doll. It was indeed a wonderful civilization, yet contrasted with all the wider possibilities and grand outreach of Christian civilization, how narrow and disappointing, how like a bird fitted to fly, yet shorn of its wings. The other scene was Whitefield's portable pulpit standing with "voiceless eloquence" in the department of the Bible Society. Rough, unadorned, requiring but little skill in its making, yet it was the rostrum whence had rolled forth the words that had stirred thousands of souls to new and holier things, and where the Bible in the hands of the humble preacher of the Cross had proved the harbinger of a more auspicious civilization in the wilds of the new world than ever dawned upon a heathen past. China and America—the oldest civilization in the world, and the newest with the Bible its ministrant of mercy, thus brought into unconscious contact together! As those two scenes rise up before us, with all that is signified as coming with that Sacred Word, a new glory gilds its page, a new honor attends its way, as still the Old Sufficient Guide Book, and the language of the Psalmist gains fresh meaning and force as a truth still supreme, "The entrance of Thy *words* giveth light."

"THE FINAL PHILOSOPHY."

[A Paper read before the American Institute of Christian Philosophy, 27th April, 1882.]

BY THE REV. WILLIAM L. LEDWITH.

WHEN Dr. Charles W. Shields published his essay on the "Philosophia Ultima" in 1881, it was hailed by the *Princeton Review* as a production that gave evidence of a philosophic capacity, insight, and culture quite remarkable, and did not hesitate to pronounce it a production to which none but the fewest are equal in its manifestations of philosophic, rhetorical, and æsthetic power, and full of promise as to the author's future. As a partial result of the study outlined in that essay, we have the "Final Philosoply," which has met with a hearty acceptance and soon passed into a second edition. Throughout the entire work there is a genuine enthusiasm concerning all that is true and good, and a strong belief in the final triumph of truth over all forms of error. Its pages give evidence of circumspect, clear judgment and exact expository method as expressed by one of his German critics, who hailed the work "as a manifesto of American idealism."

It is an opinion more or less prevalent that there is a great conflict between Science and Religion, and that between these two departments of knowledge there is a great gulf fixed. The treatment of the subject by this work would seem to strengthen this opinion because of the particular method pursued, though there is no conscious intention on the part of the author to exaggerate. It is for us to keep in mind that, although the theories or works of over nine hundred authors are quoted or referred to, there is a great deal of nebulous matter or star-dust among

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the bright particular stars; and that while a few great master-minds are engaged in a contest more or less real, the great mass round about add very little to the force of it, unless it be by their shouting. Although it may be evident to the careful student that there has been the unsheathing of swords and the clashing of arms, we are not at liberty to magnify every little skirmish into a pitched battle, nor to imagine that every little cloud of dust is the smoke of artillery. A flock of sheep may raise as great a cloud of dust as a battalion of soldiers rushing to battle; and the voice of the magpie is heard more frequently than that of the eagle.

There is a marked difference between the scepticism of doubt and the scepticism of inquiry; and there is often need of patient waiting until there is a complete moral diagnosis before we decide concerning any one that the whole head is sick and the whole heart is faint. The loud cries and shouts that may be heard in the field of conflict are not all of triumph over the right, nor the tones of atheistic loneliness and despair. A certain amount of philosophical scepticism, as distinguished from religious disbelief, is needed for the full development of truth, and is a wholesome tonic to keep the moral system from becoming sluggish and inactive. Even in extreme views the results are not wholly disastrous. The controversies with the Gnostic heresies led to a scientific enunciation of the doctrine of the Trinity by Tertullian and Irenæus. English deism led to clear distinctions between natural and revealed religion, and produced Butler's "Analogy." The scepticism of Strauss was the direct cause of many sound evangelical works concerning Christ and his works, which perhaps but for this would never have been written; and the publication of "Essays and Reviews" called forth a pure literature of over four hundred volumes. Wholesale denunciation may make a great impression, but, like thunder, its power is ended as soon as it has ceased. We should never take our grain to the mill until it is separated from the chaff. In the ranks of philosophy, as in the fold of the church, there are to be found the seven thousand who have not bowed the knee to Baal.

The scientists are not all heretics, nor the men of religion all bigots. Faraday is not the only one who had but a door be-

tween his laboratory and his oratory; nor is Julian the only one who has been led to cry out, "O Galilean, thou hast conquered!"

The author, in his work, has sought to pursue a course between the jargon of sects and that of the schools. It has been his aim to state the questions rather than discuss them; and he ever recognizes and insists on the truth that science and religion cannot do without each other, but are the "supporting segments in the same rising arch of knowledge; harmonious interests, wedded

"'Like perfect music unto noble words.'"

The general tone is healthy, and there is no trace of the fear, as entertained by some, that a mixture of these would make what Bacon calls an heretical religion and a fantastical philosophy. But on the contrary he seeks to show that the relation between these is logical, historical, and practical; and that by a harmony of these relations, which are very extensive, complicated, and vital, we may aspire to the Ultimate Philosophy.

The activity of the human mind in all ages in its search after and battle for the truth is set before us so that we may note the progress from stage to stage, with the increased misunderstanding and separation which takes place. It begins with the age of pagan philosophy and the past Christian age of pagan science, when there existed little love between the grove, the lyceum, and the porch of Solomon. This was a period when the pure gospel was corrupted with an eloquent sophistry, and the culture of logic and geometry was considered as one of the crimes of heretics. Succeeding this came the age of the Greek fathers, in which science and religion were more or less corrupted with each other; and then the scholastic age, in which there is a revival of letters and the revolt of reason from authority. In this period we find the seeds of much of our modern culture. Next comes the reforming age, during which there was the beginning of the rupture between philosophy and theology, and from which we have the extreme results of to-day. It is to be noted that one of the chief results of the separation is that it has brought out more clearly the distinction between the natural on

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the one hand, as represented by the region of phenomena, laws and forces, and the supernatural on the other, as it can be traced in divine manifestations, causes and purposes. And now the great question is whether the scientific or religious conception of the universe shall hold its ground. The subject is then taken up and studied in its various phases in seven departments of knowledge—from astronomy to philosophy. The men of thought, whose theories and discoveries are here set forth, are divided into four general classes, and the course of their opinion is traced to all these seven divisions of knowledge, which renders necessary a certain amount of repetition that otherwise would greatly mar the literary cast of the work. In the first class we find the Extremists, or "the men who carry the black flag in the field of philosophy; who, as religionists or scientists insist against each other upon exclusive jurisdiction throughout the entire domain of truth."

As advocates of their own views, they stand apart, the one looking upon philosophy as the wisdom of the world, and the other despising Christianity as the superstition of the Jews. They are either requiring a sign or seeking after wisdom. The one often ends in a bigotry called Religion, and the other in infidelity, veiled under a mask called Science.

The second class are called the Indifferentists, or those with whom the "love of a theory or creed proves stronger than the love of truth." This class has its beginning in the early Greek Sophists and Latin fathers, and has steadily advanced until now it has assumed "an imposing sciolism which would politely bow all religion out of science, and on the other side a lofty dogmatism, which would austerely frown all science out of religion."

The third class is composed of the Impatients or Eclectics. They have a zeal which is not always according to knowledge, and, feeling sure of the ideal unity of truth, they would make a premature and illogical combination of the questions which arise in these two spheres of thought, and thus attempt, as Timon of Athens expresses it, "to solder close impossibilities and make them kiss." Some would take into their creed all that reason offers, and others would appropriate for the confirming of their theories all that revelation makes known. And from these

hasty generalizations we get a crude amalgam of the cant of divines and the creed of thinkers.

The fourth class includes all the Despondents or Sceptics. These are the men who give up everything as contradictory and irreconcilable. They lose sight of religious truth in metaphysical abstractions, or so confuse natural facts with the chaos of doctrines as almost to destroy mental and moral activity. As the professed kings of modern thought, they are dumb, and continue to live as mental and moral paralytics because they dare not die. All such scepticism is clearly shown to be weak and ignoble because it reasons from narrow and unfounded premises, ignores past progress, and mistakes the present social exigency. As a result of the examination by these four divisions, it is shown that there have been three distinct stages of progress: a stage of healthy separation and progress, a stage of mutual avoidance, and then a stage of open rupture, "issuing in antagonistic speculations and beliefs."

The second part of the work treats of the umpirage of philosophy between science and religion. The present state of the sciences is carefully discussed, with the recognition of the common elements, for there is scarcely a dogma which has not served as an hypothesis in science, as there is scarcely an hypothesis which has not been used for a dogma in religion. Though the problems are neither purely scientific nor purely religious, they are essentially one.

But what is philosophy? From Cicero we learn that it is the science of things divine and human, and of the causes in which they are contained. Descartes tells us that it is the science of things evidently deduced from first principles. Kant declares it to be the science of the relations of all knowledge to the necessary ends of human reason. Philosophy is claimed as the proper umpire between science and religion, because its power of abstraction, its insight into reality, its catholicity of view, and its desire for and aim at the unity of truth and symmetry of knowledge, is superior to that of the mere religionist or the mere scientist, each absorbed in his own particular line of thought.

It has been said by some that religion alone cannot furnish the needed umpire. But in recognizing her weaknesses, as they

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may be traced in superstition, mysticism, and intolerance, we are not therefore to suppose that in her high and true state she will not accomplish great things toward the fulness of times. We are ready to admit that science cannot furnish the umpire, as it would be the establishment of the less over the greater. It is bounded by the limits of the human reason, and, as its peculiar province is the discovery and co-ordination of facts in nature, it is not expected to deal with those higher and weightier matters which belong to the soul. And yet, because of her materialism, her scepticism, and her irreverence, we are not to jump to the hasty conclusion that in her true state she is not the faithful handmaid of religion.

Moral law is far above natural law, and the divine government includes the truths of the head as well as those of the heart. The truths of revelation harmonize with discovered facts, for God's truths and God's facts are never at variance and cannot clash. The trouble is not with the truths or the facts, but with the men who are dealing with them and have brought about an unnatural separation between them. It is this unnatural state which has caused the confusion. Human wisdom, instead of protecting and illustrating the truth, is busily engaged in "pulverizing all fixed convictions." Religion, as the term is here used, seeks to stigmatize and condemn all those labors in the field of science which do not fully accord with its imperfect exegesis and dogmatic interpretations. In the divine government, which includes the natural and the revealed, there is no *tertium quid* to satisfy the pride of the sceptic or the bigotry of the believer. It is either man's wisdom wholly engrossed in "fables and endless genealogies which minister questions," or the wisdom of God, who is over all things blessed forever. Two attempts have been made at a philosophical solution of the question, as may be seen in the extremes of modern speculation, the Positive Philosophy and the Philosophy of the Absolute. Then, by a combination of these, we have produced a third system of science in relation to religion.

The first form of philosophy, as represented by Comte, would ignore revelation; and the second, as advocated by Hamilton, Mansel, and Spencer, would supersede it. By the one form of philosophy we are landed in sheer nescience; while the

other would end in a fanciful omniscience—"making of science a mere dazzling paradox and all religion terrible mockery." No man can ignore the region of metaphysics. The facts of history and the insufficiency of all hypotheses which he seeks to use would be against him. The great trouble with the positivist is that he seeks to solve the problem by eliminating the fact; while the absolutist thinks to solve it by transcending the fact. When the principles of these two schools are carried out to their logical consequences, it can be shown that the positivist becomes a sceptic in both science and religion, and the world appears to him like a "museum of dry facts;" while on the other hand the extreme advocate of the absolute becomes a mystic, and man seems like a "gilded bubble in the stream of nature." Although it is shown that the error of these two systems consists in the things which they deny, it must be remembered that there is good in both: in the one as it deals with facts and the laws of facts, and in the other as it considers realities and causes.

There must be the acceptance of all truth. The arcana of nature and the mysteries of Scripture are parts of the same great whole, and from the union of these there will be what some are pleased to call the Ultimate Philosophy. But in this work of attaining final results and reaching pure truth no school of thought has the monopoly, nor can any be wholly independent of those inferior or despised schools and men who have but few grains of truth for their bushels of chaff. A truth is not changed by its surroundings, nor is it to be determined by the condition of its possessor. It may be like gold in the quantity, and need much crushing, close examination, and careful sifting. It may be concealed under some one of the various forms of error for many years, like the living seed in the linen bands of a mummy; but when once separated and surrounded by the proper conditions, the hidden power begins to manifest itself. A truth found in the theories of a positivist is not unlike a truth found in the logical conclusions of a Christian thinker. The fact eliminated from the material by a Helmholtz, a Tyndall, or a Huxley reflects light from the same source as a truth from the Word proclaimed and expounded by a Calvin, a Knox, or a Chalmers. It is the invisible things of

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God *together* with the things which are made that declare his eternal power and Godhead.

There is profound wisdom in the remark of Plato that the end of philosophy is the intuition of unity. Can this be, so long as men fail to discover or refuse to see the truth in all its beautiful proportions? We cannot fail to see evidence of great schism which is ever counteracting the efforts of the wise and good toward harmony and unity. But after all has been said and done, what is the prime cause? Answered in a simple word, it is sin. With a fountain that is unclean it is not strange that the flowing streams are bitter. The destroying of moral harmony has perverted the human judgment, blotted out distinctions which should ever be observed, and kindled in the hearts of many poets, philosophers, and sages a zeal which is not always according to knowledge.

The only sure remedy for all this must be sought for in the Word of God, where we have the "intuition of unity" set forth in language so clear and simple that none need ever err therein. In this we have the true and highest form of philosophy, because it is divine—speaking "not in the words which man's wisdom teacheth, but which the Holy Ghost teacheth."

So long as there is the holding of the truth in unrighteousness, or a reliance upon the opposition of science—falsely so called—there will be moral chaos and a still further departure from that ideal and holy unity so important to all men—God in Christ Jesus reconciling the world unto himself. All contradictions, says Neander, are reconciled in Jesus Christ. He is the divine power that is consuming the dross and purifying the truth. It can be readily traced in the "mighty argument of successive generations." It is not the work of a single day nor generation. The wheat and the tares must grow together until the harvest, and this will not be fully come until after the sowing of the Ages.

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EXCERPTS.

UNSCIENTIFIC OBJECTION TO PRAYER.—We do not pray for the suspension or interruption of any law of nature. But within the sphere of the operation of natural law to deny the power of God to direct, combine, and to influence towards certain ends, is to deny to Him what we claim for ourselves, and what constitutes the very field of scientific achievement.

Are we to believe that when the thermometer registered 95° in a sick-chamber in the stifling atmosphere of the Potomac, the ingenuity of men using the simplest device could supply cooled air in such proportions that the temperature could be kept equally at 75° from hour to hour, and yet that God, because He does not work with hands, and by the rude, external modes of human interference, cannot by His will so co-ordinate and arrange these natural forces, that with no interruption of their acting, and no contradiction of their nature, He can send rain or wind, or heat or cold, a pestilence or health, or raise the sick to life, if He so ordain? Are we to believe that by the wit or skill of man, only combining and arranging in accordance with natural laws, using a line of wire and some acid and metals, the bulletins of every change in the sufferer's condition could be flashed, hour by hour, to the most remote cities and villages of this vast country, and beneath the sea to other countries, causing the hearts of all to beat as one heart, in the alternations of hope and of despair, causing the tenderest and most spiritual sympathies of men to be thus communicated regardless of time and distance; and are we to deny that God can produce any effect or exert any influence over the works of His own hands? Can we believe that a man wounded to death, to whom an untoward motion might be fatal, could be carried along the

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lines of a great railway, with its quick-following trains thundering in both directions a distance of two hundred and fifty miles in the quarter of a day, yet softly, quietly, gently, every train arrested as he passed, not a bell or a whistle sounded, nor even the hiss of escaping steam allowed; while the people from Maine to California waited with hushed breath to learn the result of the experiment; and that God has no part in bringing about the effect of those forces which are in operation about us every day, and which exert so great an influence in the mind and spiritual sphere? May God forgive the impious suggestion. Thank God! These tremendous forces whose delicate and precise adjustment are necessary to afford the conditions of the life of men upon the earth are not left to themselves. Life does not depend upon the balancing and ordering of such forces, without intelligence in the management. This rush of worlds through space, these powers engendered by the heat of the sun, these springing forces bound up in air and earth, one little effort of which beyond their appointed limit would send us hurtling to destruction, are in the hands of the Heavenly Father. Which is right, this universal instinct of men that we are in the hands of God, and which, when danger threatens or a great sorrow hangs over them, sends men of all creeds and classes to prayer to God for help or the speculations of a few proud, emancipated philosophers who have entered into the heritage of discovery left them by greater men than they, men of reverence and faith in God, who would have us believe that the crucible and the microscope and the scales are instruments by which we can discern all causes and forces which are acting in the universe. Rather let us believe that these natural laws are themselves not only God's instruments, but the evidence of His activity. That He upholds them in being, and causes them to be as they are. That a miracle is no more truly the exhibition of His immediate energy than are those of His mediated energy. That the intelligence and love which we discern in the adaptation of nature were not only impressed in the creation, but are manifested every moment, and in every change. That wherever we see the evidence of wisdom we see God. Wherever there is evidence of beneficence there is God. Wherever there is power directed to an end, there is the mani-

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fested presence of the personal God, conducting all things to their best results. Let us believe that in Him we live and move and have our being. That we sleep in quiet and awake refreshed, because He not only watches over us, but sustains us. That every breath, every pulse, all our immunity from danger, all our security in the ordered sequence of the seasons, and in the stability of society, and the progress of the world, depend upon His presence, and on the manifestations of His presence and of His power. That He is not a God afar off, but nigh us and within us and about us. And let us pray to Him therefore, when trouble comes, or in peaceful scenes, for the continuance of His care, sure that He hears us, and saying with the confidence of children, "Our Father which art in heaven." —*From a Discourse by Prof. C. Wistar Hodge, of Princeton, N. J.*

RAIN.—Vast property has been destroyed and multitudes of men terrified by the rain; but how few are impressed with the mighty power of God as manifested in the rain: one drop of rain means omnipotence. "There are," says one of the leading scientists of the day—Mr. Proctor—"perhaps few natural phenomena which appear less indicative, at first sight, of the operation of nature's giant forces than the downfall of rain. Even the heaviest showers—at least of those we are familiar with in England—are not phenomena which suggest an impression of power. Yet the forces actually called into action before rain can fall are among the most gigantic experienced on our earth. Compared with them, terrestrial gravitation is more feeble than is the puniest infant compared with an army of giants. Let us look into the matter a little closely, and we shall see that this is so. It is a common occurrence for rain to fall over an area of over one hundred square miles to a depth of one inch in twenty-four hours. Now, what is the expenditure of which such a phenomenon is the equivalent? The downfall is, so to speak, the loosening of the spring; but how much force was expended in winding up the spring? The evaporation from the sea or from moist soils of the quantity of water precipitated is not the whole of the work to be estimated; since the vapor has to be raised to the higher regions of the air and to be wafted

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by the winds—themselves the representatives of giant forces—to the district over which the moisture is discharged in rain. But let us take this evaporation only, and estimate its real force equivalent. It may be shown, by a calculation founded on Mr. Goule's experiments, that to evaporate a quantity of water sufficient to cover one hundred miles to the depth of one inch would require as much heat as is produced by the combustion of half a million tons of coal, and, further, that the amount of force of which such a consumption of heat is the equivalent, corresponds to that which would be required to raise a weight of upwards of one thousand millions of tons to the height of one mile. . . . All the coal which could be raised by man from the earth in thousands of years would not give out heat enough to produce by evaporation the earth's rain supply for one single year. The sun—whose influence is often contrasted with that of the rain shower—is the agent in producing that shower as well as in pouring out his direct heat on the soil with such apparently contrasted effect." Well may a prophet cry out, "Fear the Lord your God, that giveth rain" (Jer. v. 24).

HISTORICAL.

1882.

THE Monthly Meeting for January was held on the 26th of the month, at the Rooms. The President was in the chair. Holy Scripture was read and prayer offered by Rev. A. H. Bradford. The following gentlemen were elected Vice-Presidents, viz.: Francis L. Patton, D.D., LL.D., for New Jersey, and Mark Hopkins, D.D., LL.D., for Massachusetts. The following amendment to the Prospectus was adopted: After the "Seventh" statement of "Objects," add "*Eighth:* To interest Christian men and women, *learned and unlearned*, in the production, the circulation, and the reading of a literature which shall promote intellectual and religious culture." A paper written by President John Bascom, of the University of Wisconsin, was then read and discussed; the subject, "*The Freedom of the Will empirically considered.*"

The Monthly Meeting for February was held on the 23d of the month. In the absence of the President and Vice-Presidents, Rev. Edward M. Deems was elected President *pro tem.* Religious services were conducted by Rev. A. K. Strong. The following gentlemen were elected Vice-Presidents: P. H. Mell, D.D., LL.D., the Chancellor of the University of Georgia, for Georgia, and William A. Scott, D.D., LL.D., for California. A paper was read by Rev. L. D. Bevan, D.D., on "*The Unconditioned Ego*," and was discussed at large.

The Monthly Meeting for March was held on the 30th of the month, the President in the chair. Thirty-two new members were added to the roll. Religious services were conducted by Rev. Dr. Watkins, Rector of the Church of the Holy Trinity,

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New York. The following gentlemen were elected Vice-Presidents: William H. Allen, LL.D., President of Girard College, for Pennsylvania; Roswell D. Hitchcock, D.D., LL.D., President of the Union Theological Seminary, for New York; and the Rt. Hon. the Earl of Shaftesbury for England. A paper by the Rev. S. S. Martyn, on "*The Bible as a Final Authority of Religious Truth*," was read by Rev. Carlos Martyn, and discussed. It was ordered "that in the statement of the 'Objects' of the Institute, in the 'First' all words be omitted after the words 'Holy Scripture.'"

The Monthly Meeting for April was held on the 27th of the month, the President in the chair. Religious services were conducted by the Rev. Dr. J. P. Wilson, of Newark, N. J. Mr. R. T. Haines was Secretary *pro tem.* A paper by the Rev. William L. Ledwith on "The Final Philosophy" was read and discussed. Sixteen new members were added to the roll. It was "Resolved, that the officers be requested to solicit by letter donations to form a fund of $2000 to furnish a course of lectures next winter in the city of New York, under the auspices of the Institute, on the subjects set forth in our prospectus." It was also "Resolved, that there be appointed Honorary Vice-Presidents from among gentlemen in foreign countries who may become members of the Institute." Whereupon Rt. Hon. the Earl of Shaftesbury, his Grace the Duke of Argyll, and the Most Rev. Richard Chenevix Trench, Archbishop of Dublin, all Associate Life Members, were made Honorary Vice-Presidents.

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SYLLABUS OF LECTURES FOR THE YEAR 1882.

Tuesday, July 11.

MORNING: Prof. GEORGE P. FISHER, Yale College.

"*The Argument for the Being of a God.*"

Wednesday, July 12.

MORNING: Prof. GEORGE P. FISHER, Yale College.

"*Miracles: and their Place in Christian Evidence.*"

EVENING: Mr. CHARLES F. WINGATE, Sanitary Engineer.

"*Cleanliness and Godliness.*"

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Thursday, July 13.

MORNING: LYMAN ABBOTT, D.D., Editor of the *Christian Union*.
"*What the Bible is and why I believe it.*"

EVENING. W. MORRIS BUTLER, A.M., M.D., Middletown, N. Y.
"*The Curiosities of Insanity.*"

Friday, July 14.

MORNING: Prof. GEORGE T. LADD, Yale College.
"*Nature and the Supernatural.*"

EVENING: Mr. HAMILTON W. MABIE, of the *Christian Union*.
"*Literature and Popular Life.*"

Saturday, July 15.

MORNING: Prof. GEORGE T. LADD, Yale College.
"*Revelation.*"

Sunday, July 16.

MORNING: ROBERT S. MORAN, D.D.
Sermon. "*Unification of all Things in Christ.*"

Monday, July 17.

MORNING: Prof. GEORGE T. LADD, Yale College.
"*Inspiration.*"

Tuesday, July 18.

MORNING: WASHINGTON GLADDEN, D.D., Springfield, Mass.
"*Christianity and Social Science.*"

EVENING: Prof. CHARLES A. YOUNG, Princeton, N. J.
"*Distances and Dimensions of the Heavenly Bodies.*"

Wednesday, July 19.

MORNING: Mr. S. H. WILDER, Brooklyn.
"*The Spencerian Philosophy a misinterpretation of the Doctrine of the Correlation of Forces.*"

EVENING: Prof. YOUNG.
"*The Physical Constitution of the Sun.*"

Thursday, July 20.

MORNING: Prof. NOAH K. DAVIS, University of Virginia.
"*The Duality of Mind and Brain.*"

EVENING: Prof. YOUNG.
"*The Moon.*"

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Friday, July 21.

MORNING: **Anniversary Meeting: Addresses by Rev. Dr. DEEMS, Rev. Dr. Roswell D. Hitchcock, Rev. A. H. Bradford.**

EVENING: **Prof. YOUNG.**
"The Planets."

Saturday, July 22.

MORNING: **President JOHN BASCOM, University of Wisconsin.**
"Mind and Matter: their Present Relation."

EVENING: **Prof. YOUNG.**
"Meteors and Comets."

Sunday, July 23.

MORNING: **HOWARD CROSBY, D.D., LL.D., New York.**
Sermon: *"God and Man Mutually Visible."*

Monday, July 24.

MORNING: **President JOHN BASCOM.**
"Mind and Matter: their Ultimate Reference."

EVENING: **Prof. YOUNG.**
"The Stars and Nebulæ."

Tuesday, July 25.

MORNING: **FRANCIS L. PATTON, D.D., LL.D., Theological Seminary, Princeton.**
"Genesis of the Idea of God."

All members and associate members are entitled to all the lectures and will be admitted free to all exercises. They are requested to bring with them their membership cards. All other persons will be required to pay 50 cents at the morning lecture and that will entitle them to admission to all the remaining exercises of the day.

These lectures are to be delivered at Warwick Woodlands, Greenwood Lake, a most delightful summering place, forty-two miles from New York. For information how to reach the spot, the cost of transportation, subsistence, etc., address the treasurer, Mr. William O. McDowell, 4 Winthrop Place, New York.

The Christian Philosophy Quarterly.

No. for October, 1881.—1. Historical.—2. The Cry of "Conflict:" by President Deems, of the Institute.—3. What we mean by Christian Philosophy: by President Porter, of Yale College.—4. Some Difficulties in Modern Materialism: by Prof. Bowne, of Boston University.—5. The Religious Aspects of the American Scientific Association: by Prof. Trowbridge, Glasgow, Mo.

No. for January, 1882.—On the Origin and Primitive State of Man: by Prof. Stephen Alexander, LL.D., Princeton.—2. Astronomical Facts for Philosophical Thinkers: by Prof. C. A. Young, LL.D., Princeton, N.J.—3. Condition of Spiritual Sight: by Rev. Amory H. Bradford, A.M., Montclair, N. J.—4. The Foundations of Christian Belief: by Lyman Abbott, D.D.—5. Freedom of Will Empirically Considered: by John Bascom, LL.D., President University of Wisconsin.—6. Historical.—7. Notes.

No. for April, 1882.—1. The Speculative Consequences of Evolution: by Alexander Winchell, LL.D., Professor of University of Michigan.—2. Science and Revelation: by J. H. McIlvaine, D.D., Newark, N. J.—3. English Philosophy: by Rev. J. W. Mendenhall, Ph.D.—4. The Ego in Consciousness: by Llewellyn D. Bevan, D.D.—5. Historical.—6. Notes.

The "Quarterly" is sent free by the Institute to all its Members and Associate Members, beginning with the latest number published before the reception of the membership fee and continued so long as the membership is maintained. If any earlier number is desired, the member must order it from the publisher.

FORM OF BEQUEST.

I BEQUEATH to my executors the sum of dollars, *in trust*, to pay over the same in after my decease, to the person who, when the same is payable, shall act as Treasurer of the American Institute of Christian Philosophy, founded in the city of New York, 1881; to be applied to the uses and purposes of said Institute, under its direction.

☞ All communications should be addressed to Rev. A. H. Bradford, the Secretary of the American Institute of Christian Philosophy, and all checks, drafts, postal orders, etc., be made payable to the order of W. O. McDowell, the Treasurer of the AMERICAN INSTITUTE OF CHRISTIAN PHILOSOPHY, 4 Winthrop Place, New York.

Please read the Second Page of this Cover.

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GREENWOOD LAKE.

In view of the approaching session of the Summer School of Christian Philosophy, July 11th to 28th, 1882, numerous inquiries have been made in regard to the **WARWICK WOODLANDS, Greenwood Lake.** This article is intended to answer them:

HOW TO GET TO THE PLACE.

From New York, take the trains of the New York and Greenwood Lake R. R., that leave the Jersey City Depot of the N. Y., L. E. & W. R. R., connecting with the ferry boats from the foot of Chambers and Twenty-third Streets, New York. Chambers Street at 8.30 A. M. and 4.40 P. M., and Twenty-third Street at 8.15 A. M., and 4 P. M.

Buy your ticket for Warwick Woodlands at $1.00, good for a return ticket on presentation at office of Warwick Woodlands, at any time while the Summer School is in session.

If parties should be made up from churches or otherwise, they can hire cars for any day that will seat 60 grown persons or 90 children each, on the following terms. This will include the sail across the Lake to Warwick Woodlands:

New York.		Newark and Orange.		Bloomfield and Montclair.	
1 Coach	$ 55	1 Coach	$ 45	1 Coach	$ 40
2 Coaches	100	2 Coaches	80	2 Coaches	70
3 Coaches	135	3 Coaches	100	3 Coaches	95
4 Coaches	160	4 Coaches	120	4 Coaches	115
5 Coaches	175	5 Coaches	140	5 Coaches	130

ADDITIONAL, $25.

TICKET RATES.

New York, 200 or more, 85c.; 300 or more, 65c. Newark and Orange—200 or more, 80 c.; 300 or more, 60c. Bloomfield—200 or more, 75c.; 300 or more, 55c. Montclair—200 or more, 70c.; 300 or more, 50c. Over 300, 50 cents each from any of the above places.

One of the most beautiful short trips in the world is by the day line of steamers from Vestry Street, North River to Newburgh, passing along the Palisades and through the magnificent scenery of West Point, then from Newburgh to Warwick by railroad, from Warwick to Greenwood Lake by stage, then the steamboat sail on the Lake, and return to New York by the N. Y. & G. L. R. R.

HOW ACCOMODATED THERE.

The facilities for entertainment at Greenwood Lake are the Encampment Hotel. This consists of a large tent dining room, a thoroughly built and equipped cook house, and about fifty tents, accommodating from two to six persons in a tent, giving all the advantage of both a first class hotel, and the novelty of camping out without its inconveniences; the Brandon House, situated at the head of the Lake; the Windemere, Traphagen, Bradner, Hazen and Avington Hotels, the Lakeside House, just below the Warwick Woodlands, Brown's Hotel, at the south end of Greenwood Lake and Sindle's House at Cooper station. Besides these, arrangements can be made for board at private houses along the line of the N. Y. & G. L. R. R.

As soon as the business warrants it, the steamer Montclair will be in constant motion on the Lake, enabling those who desire to pass from one end of the Lake to the other at their convenience.

THE COST OF THE COURSE.

The excursion ticket from New York will be $1. Associate membership entitling to entrance to all lectures, and the Quarterly for one year, containing the lectures, $5. Board from $10 to $15 per week. Even this can be reduced by taking advantage of "Camping Facilities."

CAMPING FACILITIES.

In order to accommodate parties, the proprietors of the Warwick Woodlands extend a free invitation to camping out parties to encamp within the Park. Full information of the cost of tents, etc., will be forwarded on application to

J. R. BOYD, EXCURSION AGENT,

120 LIBERTY STREET, NEW YORK.

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